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G. W. Cheney



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WITH NOTES AND ILLUSTRATIONS,

BY R. T. TRALL, M. D.

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PREFACE

TO

THE FIRST EDITION.

THE views advocated in the following pages differ so widely from those generally held by writers on dietetics, and are so diametrically opposed to the habits and customs of society in this country, that I am by no means sanguine of making many proselytes ; but what will man not attempt, when fully convinced that he is laboring in the cause of truth ? If perfectly satisfied that he has arrived at a correct and important result, opposition will only redouble his ardor in supporting and spreading the doctrine he has espoused. His steady perseverance in its defence will frequently expose him to the charge of enthusiasm or egotism ; these, in fact, seem almost necessary to the man who would successfully advocate any new or not generally received opinion : every one is warm in what he considers a good cause ; and he who observes the majority of society indifferent to the truth which he believes himself to possess, can scarcely avoid displaying the characteristics of the egotist.

By defending a fruit and farinaceous diet among my own friends, I have frequently incurred similar charges ; I cannot, therefore, expect to be more leniently treated by literary and scientific critics. Perhaps, also, I may be accused of presumption, for daring to controvert points upon which physiologists are so generally agreed. It is very far from my wish to convey an impression that I place either my talents or acquirements on a par with those of the many learned and scientific discoverers who have written upon the subject, and whose views differ from my own : yet men of indifferent abilities have sometimes, by a steady and persevering attention to evidence, arrived at truths which have escaped the notice of more powerful intellects ;

and "so limited is the human capacity, that the most exalted genius, and the deepest powers of investigation, have not been able to raise their possessors above the errors and prejudices of their age, on subjects which have not been made the peculiar object of their reflection." I therefore hope that my investigations will not be found so devoid of interest as some may at a first glance suppose; nor my deductions so wide of the truth as a reference to the long-established dietetic habits of my countrymen may seem to indicate: but whatever judgment the public may pass upon the opinions here advocated, at least it will be a satisfaction to feel that I have written with a sincere desire of benefiting society in general; and more especially its members who suffer from dyspepsia and other diseases. He who undertakes to bring a new or neglected subject before the public, finds it exceedingly difficult to adopt the best arrangement of which it will admit; and the probability is, that he will not defend his views with that clearness and force which, when more generally canvassed, might be brought to their support. Hence arguments which may appear forcible and conclusive to a person whose attention has been long and steadily directed to the subject, and who has viewed it in all its bearings, may be totally inadequate to produce conviction in others who have thought little about it.

"Perhaps," as has been well observed, "the best mode of leading another to the apprehension of truth, is to show how we ourselves were convinced: and, in the announcement of a new discovery, it is always well to explain how we were first impressed with the idea, and afterwards proceeded; for nature always tells her own tale best, and in the most impressive way: by so doing, we in some measure place others in a similar position with ourselves, and enable them to judge through the same evidence which has convinced us." In accordance with this remark, I may briefly state, that I read an Essay on "Manifestations of Mind," about ten years ago, to the members of a small Literary Society, and attempted to trace the phenomena of sensation, from the lowest up to the highest forms of animated being. After the reading of the paper, and an interesting discussion on the similarity of structure in the organs of sense, and the resemblance of the nervous and cerebral development, in the superior classes of animals, to those of man, the following question occurred to me:—"Is man justified in slaughtering animals for his food; seeing that, by means of a beautifully-organized structure, they are rendered exquisitely sensible both of pleasure and pain?"

The answer I mentally returned to the inquiry was: "If the flesh of animals be necessary to the health, happiness, and longevity of man, then

the law of self-preservation will warrant his taking the life of animals ;—provided he be guilty of no cruelty, and cause no unnecessary pain to the animal which he sacrifices to supply his wants ; but if upon further inquiry it should appear that the life of man can be preserved, his health and strength maintained, his pleasure and happiness continued or rendered more pure and satisfactory, and the period of his mortal existence unabbreviated or prolonged, by a diet of which the flesh of animals forms no part,—then would neither wisdom nor benevolence sanction the horrid cruelties that are daily perpetrated, in order to pamper the perverted appetites of man.”

Believing the subject to be one of great interest, I determined to investigate it impartially, and resolved to adopt practically whatsoever should appear to be the plain dictates of nature. After carefully consulting the writings of Moses, traditionary records, comparative anatomy, physiology, chemistry, general history, and private experience, I arrived at the firm conviction, that the flesh of animals is not only unnecessary, but decidedly prejudicial to man's health and well-being. I therefore discontinued it, as an article of diet ; and, persevering in spite of the fears and remonstrances of my friends, I was soon rewarded with better health and more real enjoyment than I had experienced during many years.

Having derived incalculable advantages from a strict adherence to a fruit and farinaceous diet, and being fully satisfied (after a long and patient investigation of evidence) that it is well adapted to *all* constitutions, in *all* climates fit for the residence of man, I can no longer resist the importunity of my friends to publish the result of my experience and inquiries.

Throughout the whole of these investigations I have preferred expressing my sentiments in the language of authors eminent for talents and scientific pursuits, rather than in words of my own ; which must be my excuse for the many disconnected sentences and sudden transitions to be found in the work. On a careful perusal of the whole, I find much to be dissatisfied with ;—arising, in a great measure, from the many interruptions that have occurred during its composition ; and I would gladly have re-written it, had not my avocations forbid the attempt. I therefore solicit the indulgence of the public towards its faults and imperfections.

For much valuable information on the points I have discussed, I am indebted to the works of Drs. Lambe, Grant, Carpenter, Southwood Smith, Prout, Bird, Roget, Pereira, Dick, and Müller ; Professors Liebig, Lawrence, and Mulder ; Baron Cuvier, Mr. J. F. Newton, and many others, more especially to the “Lectures on the Science of Human Life,” by Mr. Sylvester Graham, of North America ; which I would earnestly recommend to all who feel an interest in the subject.

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EXPLANATION OF TERMS

OCCURRING IN THIS WORK,

WHICH ARE NOT USUALLY FOUND IN DICTIONARIES.

Abnormal. Irregular, contrary to rule.

Acari. Ticks or mites.

Adipose. Fatty, containing fat.

Albumen. A proximate principle existing abundantly in the white of egg.

It is also found in animal and vegetable fluids and solids.

Albuminous. Containing the properties of albumen.

Alkali. A metallic or earthy salt, as potash, soda, lime, &c.

Alkaline. Having the properties of an alkali.

Amylaceous. Pertaining to starch or the farinaceous part of grain, &c.

Azote. Called also Nitrogen. A gas which is the basis of nitric acid, and constitutes four-fifths of the atmospheric air.

Azotized. Imbued with azote or nitrogen.

Binoxide. Two equivalents of oxygen combined with a metallic base.

Brachmans. Ancient philosophers of India.

Bronchocele. A tumor on the fore part of the neck; the Derbyshire neck.

Cæcal. Appertaining to the cæcum.

Cæcum. The first portion of the large intestine, perforated at one end only.

Caseine. That ingredient in milk which is neither coagulated spontaneously, like fibrine, nor by heat, like albumen, but by the action of acids alone.

It is identical with legumine, and occurs in vegetables.

Cellulosé. The cellular substance of plants.

Cerebral. Pertaining to the cerebrum or brain.

Chyme. That particular modification which food assumes after it has undergone the action of the stomach.

- Chylopoietic.* Having the power to change into chyle.
- Comparative Anatomy.* That branch of anatomy which treats of the anatomy of other animals than man, with a view to compare their structure with that of human beings.
- Conventionalities.* Artificial agreements in contradistinction to natural obligations.
- Development.* The organic changes which take place in animals and vegetables, from their embryo state until they arrive at maturity.
- Dextrine.* The soluble or gummy matter into which the interior substance of starch-globules is convertible by diastase, or by certain acids; it is convertible into grape-sugar by boiling.
- Diastase.* A peculiar vegetable principle extracted by water from crushed malt.
- Diabetes Mellitus.* A generally fatal disease, characterized by an immoderate flow of urine which abounds with sugar.
- Diathesis.* Particular disposition or habit of body, good or bad.
- Enteritis.* Inflammation of the intestines.
- Entozoa.* A general name for those parasitical animals which infest the bodies of other animals, as intestinal worms.
- Farinacea.* Grain, roots, and other vegetables yielding farina or flour.
- Fecula.* Starch or farina.
- Fibrine.* A form of albumen found in animals and vegetables.
- Glenoid.* A term applied to some articular cavities of bones.
- Glucose.* Grape-sugar.
- Gluten.* A tough elastic substance left after washing out the starch from the flour of wheat and other grains; found also in the juices of certain plants. Coagulated vegetable albumen, soluble in alcohol.
- Goitre.* The bronchocele or Derbyshire neck.
- Ingesta.* Aliments taken into the stomach.
- Insalivation.* The act of mixing with saliva.
- Lactic acid.* Procured from sour milk or whey.
- Legumine.* A peculiar vegetable product obtained from peas, beans, &c.
- Lithates.* Salts formed by lithic acid with a base.
- Lithic acid.* An acid present in human urine; sometimes called uric acid.
- Mesentery.* A membrane in the cavity of the abdomen. Its use is to retain the intestines and their appendages in a proper position.
- Miasma.* An infectious emanation floating in the air.
- Morceau.* A bit, a morsel.
- Nascent.* Beginning to exist; coming into being.
- Nitrogen.* See Azote.

- Normal.* According to rule or principle.
- Oxide.* A compound of oxygen with a metallic base.
- Pectin.* Vegetable jelly, obtained by boiling ripe fruits with sugar and water; or by mixing the juice with alcohol.
- Pediculi.* Apterous insects, commonly called lice.
- Peroxide.* A base saturated with oxygen.
- Phosphates* Combinations of phosphoric acid with lime, soda, potassa, and other bases.
- Protein.* A chemical substance derived from albumen, fibrine, and caseino.
- Protoxide.* The lowest compound of oxygen with a metallic base.
- Purpura hæmorrhagica.* An eruption of small purple specks and patches, caused by extravasation of blood under the cuticle.
- Saccharifiable.* Convertible into sugar.
- Sodium.* The metallic base of soda and common salt.
- Tabes.* A wasting of the body.
- Tenia.* The tape-worm.
- Thoracic duct.* The trunk of the absorbents.
- Fritoxide.* Three equivalents of oxygen with a metallic base.
- Tubercle.* A peculiar morbid product occurring in various textures of the body.
- Urate of Soda.* A compound of uric acid with sodium.
- Urea.* A constituent of urine.
- Uric acid.* See Lithic acid.

INTRODUCTION.

THE ultimate object of animal life being pleasure, the law of self-preservation, or the love of life, will remain in full force so long as the sensations of pleasure are not outweighed by those of pain, or until the organs of sense become indifferent to their accustomed stimuli. Every creature, therefore, is so wisely constructed, and endowed with such instincts, as induce it to make choice of those means which are best calculated to maintain and preserve its existence: were not this the case, animal life would soon terminate.

But as individual life has a commencement, so also has it an end; and though the laws of nature should be at all times implicitly obeyed, and circumstances should be of the most favorable kind, yet there is a limit beyond which none can pass,—when vitality must yield to the universal range of chemical influence. Even man, the last and most complete result of Divine workmanship, is no exception to this general rule; nor can all his wisdom and intelligence reveal to him the means of escaping the sentence passed upon the father of our race: "Dust thou art, and unto dust shalt thou return!" This, however, should not deter him from investigating the laws of mortality, and the causes which hasten or protract the period of old age and death. "Know thyself!" was the advice of the ancient sage; and it is still further enforced upon our attention by the well known line of Pope,—

"The proper study of mankind is man."

It should, indeed, be our first endeavor to become acquainted with our position in the universe;—to mark the relation in which we stand to surrounding objects; to inquire how health and happiness, present and future, may be best promoted; diligently and faithfully to examine in what cases we have misconceived or departed from the laws of nature, by the observance of which health may be maintained, and longevity promoted; and, finally, to ascertain by what means physical and moral evil may be diminished, and the universal reign of peace and harmony established.

The man who would enjoy the greatest happiness for the longest period

should first determine the laws which influence health, for upon this depends a material portion of human happiness ; and, secondly, he should endeavor to discover what subjects are most worthy of his close attention and steady pursuit. Clearly and fully to ascertain these important points, requires no slight consideration ; but, having once satisfactorily settled these weighty questions, so far as our present knowledge will permit us, we should resolutely practise what reason shows to be most desirable ; and habit, once gained, will render the future pursuit easy and pleasant.

The superior endowments of man place him far above the rest of creation ; so that he is not under the necessity of submitting, in all cases, to the dictates of instinct and passion ; for by the possession of higher intellectual faculties, he is enabled to resist, and greatly to modify, the simple suggestions of nature. In many instances, however, man has abused this privilege ; for instead of using his reason as the handmaid, guardian, and assistant of instinct, he has placed them in collision ; and the uses of the one have been perverted and overborne by the mischievous meddling of the other. Hence the formation of unnatural and injurious habits ; which have become as powerful as original instincts, withdrawn his attention from his best interests, weakened the true principles of his nature, and entailed upon himself and society sickness, vice, and misery.

"Reasoning at every step they tread,
Men yet mistake their way ;
While meaner things, by instinct led,
Are rarely known to stray."

When, by daily repetition, and by the powerful influence of social intercourse and national prejudice, habits have been long established, emancipation from their control becomes an almost impossible task ; and when either practice or opinion is nearly universal, its propriety or truth is seldom questioned. If, by any means, the attention of an individual be directed to the consideration of a generally-received opinion, and he arrive at a conviction opposite to that of the society by which he is surrounded, there is little chance of his making many converts ; nay, the probability is that, however clear and confirmed his views may at one time appear to himself, he will gradually yield to the overwhelming influence of example, and the frequently-expressed opinions of his associates ; for a weak objection acquires all the force of a strong one, by repetition. If, however, a man have sufficient decision and courage to depart from the usages of society where he considers them wrong and injurious, or resolutely and perseveringly to maintain any unpopular belief,—more especially if opposed to the appetites and pleasures of mankind,—he may calculate upon being laughed

at for his singularity, and perhaps subjected to the daily jeers and witticisms of those who are carried along the stream of public opinion or local customs. The doctrine or practice is attributed by them to whim, caprice, eccentricity, or some still more unworthy motive. Every new opinion, therefore, though capable of the clearest demonstration, must necessarily be slow in its progress. Most people are so busily engaged with their daily avocations, that they have no leisure to consider a subject which demands time and attention, and less inclination when that subject is represented as a novelty. Some, perhaps, though convinced, deem it of too little consequence to demand a change of habit; while others possess too little moral courage to brave the taunting observations of their companions. Thus are the same customs continued through long periods of time; and the thinking few are held in thralldom by the *οἱ πολλοί*, or unthinking many; so that "the discoveries of one generation can only become the established and influential truths of the next."

It is, however, our duty and interest to inquire, how far the practices and habits of mankind accord with the original intentions of nature; and what effect any departure from truth, if I may be allowed the expression, has had upon our health, happiness, and longevity. To trace all the errors of mankind in this respect, would be an endless, if not altogether an impossible task; for—the functions of some organs having been vitiated, and the senses very much impaired—it requires great care lest we mistake the perverted for the original use, and thereby find "the light that is in" us to "be darkness." Nay, mankind now live in such an artificial state, that it would be almost impossible to dispense with many acquired habits; they have become, as it were, essential to their comfort and well-being: all changes, therefore, should be adopted with caution, lest, by too sudden a return to nature, we inflict upon ourselves and the community a greater injury than we are endeavoring to cure.

"But pliant nature more or less demands
As custom forms her; and all sudden change
She hates of habit, even from bad to good.
If faults in life, or new emergencies,
From habits urge you by long time confirmed,
Slow may the change arrive, and stage by stage;
Slow as the shadow o'er the dial moves,
Slow as the stealing progress of the year."

ARMSTRONG.

But as, without bodily health, physical strength, and mental vigor, man is rendered miserable, and incapable of securing to himself that full amount of enjoyment and longevity which nature has placed within his reach, and qualified him for attaining; he should carefully note all such circumstances

as exercise a direct or indirect influence over the development of his organization, which is the foundation upon which the superstructure of all that is great, good, and desirable in human nature must be erected.

To no subject, perhaps, do these observations more directly apply, than to that of human diet. Every latitude of the earth has its peculiar productions; and every division of society has its special and long-established modes of satisfying the hunger and thirst, which remind man of the changes incessantly taking place in the animal structure. In the warmer regions of our planet, vegetable substances chiefly constitute the nutriment of our race; some feasting on delicious fruits; others on food of a more farinaceous description, such as rice, sago, and maize, with a variety of other grains and roots. In temperate climes, man appears of a more omnivorous character; and, while indulging his appetite with a multiplicity of rich dishes from the vegetable world, he is still more luxurious in highly-seasoned preparations from the flesh of almost every class and order of the animal kingdom. In the colder regions,—so unfavorable to the production of vegetable substances, as well as to human development,—man is under the necessity of resorting to an almost exclusively animal diet; so that the Esquimaux feeds with as great a relish upon train-oil and sawdust, as the Wallachian does on fruit, or the Brahman on rice; and to the Greenlander, the half-frozen, half-putrid flesh of the seal is as choice a morceau as a woodcock to an English gourmand. Thus, through the various climates of our globe, every variety of food—vegetable as well as animal—is compelled, in one shape or other, to supply nutriment to the human organism; yet health and long life seem limited to no particular district, nor confined to any precise kind of diet. We are not from this, however, to conclude, that man may indulge in all kinds of food with impunity; or that each kind, whether of an animal or vegetable nature, is equally productive of a healthy state of the body, or equally favorable to longevity; for though the habits of a nation may be correct as regards food, many other injurious customs or circumstances may neutralize the good effects of a natural diet, and place the people on a par with those whose food is not so well adapted to their constitution. Most people in this country are aware of the necessity of attending to diet; and it is a matter of universal experience, that in hot climates, a mixed diet, in which animal food abounds, is productive of disease; while in cold climates, fat, oil,* or other carbonaceous compounds, are

* This passage seems obscure. Fat and oil may be necessary *as food* in cold climates, because nothing else can be procured in sufficient quantity; not because of their carbonaceous nature merely. All ordinary vegetable foods contain all the carbon requisite for sustenance, respiration, and animal heat, as far as the element of carbon is concerned. T.

absolutely necessary to man's existence. The fact is that, in all regions of the globe, the diet of man has been determined by the circumstances in which he has been placed, rather than by the exercise of his primitive and uncorrupted instincts, or the rational deductions of a sound understanding.

The following questions, therefore, seem to be suggested for our consideration :—

I. What was the original food of man?

II. Is he so wonderfully constructed, that climate and locality alone determine on what substances he shall feed? Or does his organization, like that of other animals, manifest a special *adaptation* to one specific kind of food, but with an extensive range of *adaptability* to the greatest variety of animal and vegetable productions?

III. What is the best food of man; or, what diet do science and experience point out, as best calculated for promoting health, happiness, and longevity?

IV. What seems designed to be hereafter the universal diet of mankind?

I shall now attempt to show, that there are data sufficient for enabling us to solve these important questions; which, although totally independent of each other so far as evidence is concerned, are, notwithstanding, so intimately connected in other respects, that the answer to one being fully established, the others may be legitimately derived as corollaries from it. A distinct line of evidence will be observed, however, in the solution of each question; and I hope ultimately to prove, that fruits and roots, with other farinaceous and succulent vegetables, were the original food of mankind; that they are the natural and best food; and will hereafter become the universal food of our race. After many years' attentive consideration of the subject, I cannot but regard it as materially affecting the interests and happiness of man; and I trust, therefore, the reader will not hastily dismiss the arguments advanced, but will diligently consider and weigh the evidence for himself; biased as little as possible by the pleasurable associations which, upon this subject, are so apt to oppose candid inquiry, to warp the judgment, and to render nugatory the deliberate convictions of the understanding. A delicate morsel is often too strong a temptation to be resisted, even when we know that future pain will be the result of the indiscretion. Arguments, however strong, and reasons, however clear and logical, are

apt to lose their force, when opposed by appetite and pleasure. "It is a hard and difficult task," as Cato observes, "to undertake to dispute with men's stomachs, which have no ears;" but—

"Ita fit, ratio preest, appetitus obtemperet."

A time will doubtless come, though we may not live to witness it, when man will become more rational, and when his inquiry will be, "What is truth?"—not, "What suits my perverted appetites?"—for truth is the road to all excellence: all its ends must be good; and all its effects on man must be pure pleasure and real happiness. "Time is the cradle of knowledge. Time will wear out the old clothing of thought, when reason and common sense will come to be the fashion." All truths—whether of a physical, moral, or religious nature—must harmonize; because they all flow from the same universal Source of Good; and must terminate in producing the greatest amount of happiness of which the nature of man is susceptible.

PART I.

ORIGINAL FOOD OF MAN.

ORIGINAL FOOD OF MAN.

CHAPTER I.

EVIDENCE FROM THE WRITINGS OF MOSES AND FROM TRADITION.

Καὶ εἶπεν ὁ Θεὸς, Ἴδου δέδωκα ὑμῖν πάντα χόρτον σπορίμον σπεῖρον σπέρμα, ὃ ἐστὶν ἐπάνω πάσης τῆς γῆς· καὶ πᾶν ξύλον, ὃ ἔχει ἐν ἑαυτῷ λαρπὸν σπέρματος σπορίμον, ὑμῖν ἔσται εἰς βρῶσιν.
—GEN. i. 29.

[NOTE 2. "And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat."

The reader will bear in mind that the word "meat" often occurs in Scripture as synonymous with *food*.
T.]

1. INFORMATION respecting the Original Food of Man is necessarily included within very narrow limits; but all accessible sources are decidedly in favor of its having been derived from the vegetable kingdom. Sacred and profane authors unite in representing the progenitors of our race as frugivorous. At a subsequent period, they are stated to have fed upon plants of a more herbaceous character; and at a still later period, they are recorded as having become "riotous eaters of the flesh" of other animals. These periods are also characterized by different states of innocence, virtue, justice and happiness; and correspond to the golden, silver, brazen, and iron ages of the poets.

2. Moses, after describing, with great force and beauty, the progress of creation, and finally the production of (אָדָם)* Adam, or man, thus proceeds: "And God said, Behold, I have given you every herb bearing seed

* Gesenius, and other Hebraists, do not consider אָדָם as the proper name of the first man, but as an appellative referring to the race of mankind.

which is upon the face of all the earth, and every tree in the which is the fruit of a tree yielding seed ;—to you it shall be for meat.” (Gen. i. 29.) Here we have plainly and distinctly stated, what God intended should be the food of mankind ; and which, no doubt, would be best adapted to his nature, most conducive to his health, happiness, and longevity ; and the best calculated (so far as food is concerned) for preserving purity of mind, and for subjugating the passions to the mental powers. Man, at his first creation, was placed in a situation in which he might find abundance of such delicious fruits as were adapted to please his eye, gratify his taste, and contribute to his bodily and mental vigor ; for we are further informed, that “The Lord God planted a garden* eastward in Eden ; and there he put the man whom he had formed. And out of the ground made the Lord God to grow every tree that is pleasant to the sight, and good for food : the tree of life, also, in the midst of the garden ; and the tree of knowledge of good and evil.” (Gen. ii. 8, 9.) “And the Lord God took the man, and put him in the garden of Eden to dress it and to keep it. And the Lord God commanded the man, saying, Of every tree of the garden thou mayest freely eat ; but of the tree of the knowledge of good and evil thou shalt not eat : for in the day that thou eatest thereof thou shalt surely die.” (Gen. ii. 15—17.)

3. No one, I think, can mistake the language here employed ; or arrive at any other conclusion, than that fruit and herbs bearing seed were expressly granted as the food of man ; and we shall find that his organization was in perfect harmony with this divine command. He was placed in the garden of Eden, or “garden of delight,” that he might “dress it and keep it,” for the purpose of supplying him with all such fruits as were “pleasant to the sight, and good for food.” Some have contended, that this food is not sufficient to sustain the health and vigor of man ; but we may rest assured, that what is of divine appointment will be amply sufficient to produce the effect intended.

4. In the works of the Greek and Latin authors we meet with frequent allusions to this period, in which man lived in a state of innocence and happiness ;—the “golden age,” when he fed upon the delicious fruits of the earth ; when his bodily strength and mental energies were in great perfection ; when human life extended through such long periods of time, that the men or heroes of those days were considered immortal ; when peace

* The Hesperidum Horti, or Gardens of the Hesperides,—producing golden apples, (as the mythologists represent,)—appear to have derived their name from עֵץ הָדָר (Ez Hadr), a fruit tree ; and in allusion to the Garden of Eden here described.

reigned throughout the whole creation ; and when a perpetual spring rendered the earth abundantly productive. Ovid* thus describes this state :

"The golden age was first, when man, yet new,
No rule but uncorrupted reason knew ;
And, with a native bent, did good pursue.
Unforced by punishment, unawed by fear,
His words were simple and his soul sincere.
Needless was written law, where none oppressed ;
The law of man was written in his breast.
No suppliant crowds before the judge appeared ;
No court erected yet, nor cause was heard ;
But all was safe ; for conscience was their guard.
The mountain trees in distant prospect please,
Ere yet the pine descended to the seas :
Ere sails were spread, new oceans to explore,
And happy mortals, unconcerned for more,
Confined their wishes to their native shore.
No walls were yet ; nor fence, nor moat, nor mound,
Nor drum was heard, nor trumpet's angry sound ;
Nor swords were forged ; but, void of care and crime,
The soft creation slept away their time.
The teeming earth, yet guiltless of the plough,
And unprovoked, did fruitful stores allow :
Content with food which nature freely bred,
On wildings and on strawberries they fed ;
Cornels and bramble-berries gave the rest,
And falling acorns furnished out a feast.
The flowers, unsown, in fields and meadows reigned ;
And western winds immortal spring maintained.
In following years, the bearded corn ensued
From earth unasked, nor was that earth renewed.
From veins of valleys milk and nectar broke ;
And honey sweating through the pores of oak."

5. The same poet—after describing the horrid cruelties inflicted upon animals, in order to appropriate their flesh as food—observes :

"Not so the golden age, who fed on fruit,
Nor durst with bloody meals their mouths pollute.
Then birds in airy space might safely move,
And timorous hares on heaths securely rove :
Nor needed fish the gulleful hooks to fear,
For all was peaceful ; and that peace sincere."†

6. The golden age is described, in heathen mythology, as under the dominion of Saturn ; when, according to Dicaearchus, as related by Saint Jerome in his books on Grecian antiquities, no man ate flesh ; but all lived

* *Metamorphoses*, Book i., L. 118 ; Dryden's translation.

† *Metamorphoses*, Book xv., L. 187 ; Dryden's translation.

upon fruits and pulse, which were abundantly produced ; and when, as Virgil remarks—

“ No fences parted fields, nor marks, nor bounds
Distinguished acres of litigious grounds ;
But all was common ; and the fruitful earth
Was free to give her unexacted birth.”*

7 Pope, in reference to the same period, observes :

“ Nor think in Nature's state they blindly trod ;
The state of Nature was the reign of God :
Self-love and social at her birth began ;
Union the bond of all things, and of man.
Pride then was not, nor arts, that pride to aid ;
Man walked with beast, joint-tenant of the shade
The same his table, and the same his bed ;
No murder clothed him, and no murder fed.
In the same temple, the resounding wood,
All vocal beings hymned their equal God ;
The shrine with gore unstained, with gold undrest,
Unbribed, unbloody, stood the blameless priest :
Heaven's attribute was universal care,
And man's prerogative to rule, but spare.
Ah ! how unlike the man of times to come !
Of half that live the butcher and the tomb ;
Who, foe to Nature, hears the general groan,
Murders their species, and betrays his own.
But just disease to luxury succeeds,
And every death its own avenger breeds ;
The fury-passions from that blood began,
And turned on man a fiercer savage—man.”†

8. Similar to this is the language of Thomson, in reference to the same period. Speaking of herbs, he says :

“ But who their virtues can declare ? Who pierce,
With vision pure, into their secret stores
Of health, and life, and joy ? The food of man,
While yet he lived in innocence, and told
A length of golden years ; unfleshed in blood,
A stranger to the savage arts of life,
Death, rapine, carnage, surfeit, and disease ;
The lord, and not the tyrant, of the world.”‡

9. This primeval state of innocence and bliss, however, did not long continue. Man forsook the way of peace ; and, by vainly assuming a knowledge at variance with the law of his God and his nature, he ate of *forbidden* food, and thus lost the image in which he had been created. He was therefore no longer a fit inhabitant of Paradise ; but was driven into less

* Georgics, i., L. 193.

† Essay on Man, Epia. iii., L. 147.

‡ Spring, L. 233.

productive climes, where the very earth refused to yield its increase without toil and labor. "Cursed is the ground for thy sake; in sorrow shalt thou eat of it all the days of thy life. Thorns also and thistles shall it bring forth to thee; and thou shalt eat the *herb of the field*. In the sweat of thy face shalt thou eat bread, till thou return unto the ground; for out of it wast thou taken; for dust thou art, and unto dust shalt thou return." (Gen. iii. 17—19.)

10. I shall not stop to inquire, whether these expressions refer to the change of climate man would experience, in consequence of his expulsion from Eden; or whether they refer to some remarkable change which took place in the general fertility of the earth. It is certain, from numerous geological data, that great alterations have been gradually taking place in the earth's atmosphere; particularly by a diminution of its temperature and carbonic acid; which would greatly affect vegetable productions, and render culture and art much more necessary to bring them to perfection. But there is no evidence, as yet, to show that any material changes have taken place since the creation of man. In whatever way the passage of Scripture may be interpreted, one thing is evident; namely, that man, after his transgression, could no longer enjoy that abundance and variety of delicious fruit with which he was originally favored; except as the result of great labor, industry, and experience; and even then he would frequently have to derive his subsistence from roots, corn, and other farinaceous and succulent vegetables: in fact, he must "eat the herb of the field."

11. To this period, it is probable, Ovid alludes, when he describes the silver age, under the dominion of Jupiter:

"Succeeding times a silver age behold,—
 Excelling brass, but more excelled by gold.
 Then summer, autumn, winter did appear,
 And spring was but a season of the year;
 The sun his annual course obliquely made,
 Good days contracted, and enlarged the bad.
 The air with sultry heats began to glow;
 The wings of winds were clogged with ice and snow;
 And shivering mortals, into houses driven,
 Sought shelter from the inclemency of heaven.
 Those houses, then, were caves, or homely sheds;
 With twining osiers fenced, and moss their beds.
 Then ploughs, for seed, the fruitful furrows broke,
 And oxen labored first beneath the yoke."^{*}

21. Up to this period, man seems to have derived his support from the vegetable world alone; and upon this food his life was prolonged to vast

^{*} *Metamorphoses*, Book I., L. 146.

periods of time. According to the generally-received chronology of the Scriptures, the average duration of patriarchal life, previously to the Deluge, was about nine hundred years. Immediately after the Flood, when animal food was permitted as an article of diet, the average period of life was reduced to four hundred years; and when Jacob lived, it had gradually declined to one hundred and fifty years. This abbreviated period of human existence may not have been the effect solely of animal diet; but it doubtless had a considerable influence.

13. Lucretius, when describing the first ages of mankind, observes :

"The nerves that joined their limbs were firm and strong;
Their life was healthy, and their age was long;
Returning years still saw them in their prime;
They wearied e'en the wings of measuring time:
No colds nor heats, no strong diseases wait,
And tell sad news of coming hasty fate;
Nature not yet grew weak, nor yet began
To shrink into an inch the larger span."^{*}

14. Sanchoniathon, a Phœnician historian who flourished about four hundred years after Moses, says, that "the first men lived upon the plants shooting out of the ground." Hesiod, the Greek poet, also says, "the uncultivated fields afforded them their fruits, and supplied their bountiful and unenvied repast." So also Lucretius :

"Soft acorns were their first and chiefest food,
And those red apples that adorn the wood."[†]

15. Similar testimony respecting the food and longevity of the ancients is also afforded by Manetho, who wrote the Egyptian History; Berosus, who collected the Chaldean monuments; Mochus, Hestæus, Hieronymus the Egyptian, and those who composed the Phœnician History; also by Hecætæus, Hellanicus, Acusilaus, Ephorus, Nicolaus, Diodorus Siculus, Herodotus, Strabo, and Jerome of Egypt.

16. Ælian[‡] tells us, "that the diet of the first race of men differed according to the different productions of their respective countries: the Athenians lived on figs, the Argives on pears, and the Arcadians on acorns." Herodotus, who wrote about four hundred and fifty years before Christ, relates that, "upon the death of Lycurgus, the Lacedæmonians, meditating the conquest of Arcadia, were told by the Oracle, that there were many brave *Βαλανηφάγοι ἄνδρες* (*acorn-eaters*) in that country, who would repel them if they attempted to carry their arms thither; as it afterwards happened."

^{*} Creech's Translation, Book v., L. 981.

[†] Ibid. Book v., L. 997.

[‡] Ælian Hist. Var., L. 8, ch. 89.

Pliny also, the Roman naturalist, says : " Mankind in the first ages subsisted on acorns ;" and Galen—the celebrated Roman physician, who flourished in the second century of the Christian era—assures us, in his work on Human Aliment, that " acorns afford as good nourishment as many sorts of grain ; that in ancient times men lived on acorns only ; and that the Arcadians continued to eat them long after the rest of Greece had begun to make use of bread-corn."* President de Goguet, in his work on the Origin of Laws, Arts, and Sciences, observes : " The first generations of mankind subsisted chiefly on plants, roots, and fruits ; of whose qualities they had no previous knowledge."

17. Dr. William Hillary, in his Inquiry into the Means of Improving Medical Knowledge, says : " Their food, during the first ages of the world, was taken from and chiefly consisted of vegetables, and their fruits and seeds, with the addition of milk from their flocks ; and water was their drink." He also infers that, as their food was plain and simple, their diseases were also simple and few, and therefore more easily cured—either solely by the efforts of nature, or, when the assistance of art was necessary, by the help of a few simple medicines or applications—than they were afterwards, when diseases were increased, and more complicated by the various inventions of luxury. Porphyry, a Platonic philosopher of the third century,—a man of great talents and learning, and of very extensive research and observation,—investigated the subject of human diet with great care and diligence. He says : " The ancient Greeks lived entirely on the fruits of the earth."

18. Hippocrates† and Celsus‡ confirm these statements respecting the primitive regimen of mankind ; and, in fact, " all writers of antiquity, of every nation,—historians, physicians, philosophers, and poets,—assert that the first generations of men, who lived nearly a thousand years, were perfectly natural and simple in their diet."

19. How long mankind continued to live upon the simple productions of the earth, we have no means of ascertaining. St. Jerome, Chrysostom, Theodoret, and other ancients, as well as moderns, maintain that all animal food was strictly forbidden before the Flood : but long before that event they had transgressed the law of God ; and there can be little doubt that the flesh of animals had, for some time previously, formed a material part of their diet. We read, that " all flesh had corrupted his way upon the

* Galen de Aliment. Facult., L. 2, ch. 88.

† Hippoc. de Præca Medico. p. 9, (fol. ed.)

‡ Celsus in Præfat. p. 2.

earth ;”* and that “ the earth was filled with violence through them :” and God said : “ Yet his days shall be an hundred and twenty years.”†

20. When the Deluge had swept away the first generations of man, permission appears to have been granted to him to eat flesh-meat ; as we learn from the following words : “ Every moving thing that liveth shall be meat for you ; even as the green herb have I given you all things. But flesh with the life thereof, which is the blood thereof, shall ye not eat.”‡ I am aware that certain advocates of a vegetable diet take a different view of this, and some other passages of Scripture, and believe that the flesh of animals for human food is still prohibited. I am inclined, however, to admit the full force of such passages ; and to acknowledge that man is not, since the Flood, restricted by the law of God from partaking of animal food.§ It was, doubtless, foreseen by the Omniscient, that mankind would, in obedience to his command, “ be fruitful and multiply, and replenish the earth :”|| that they would, in consequence of emigration and various other causes, frequently be placed in such circumstances that fruits, roots, rice, wheat, and other grains, could not be procured. Man, however, is so admirably organized as to be capable of inhabiting every clime : he is not only to “ replenish the earth,” but to “ subdue it ;” to bring it into a state of universal cultivation, and to “ have dominion over every thing that moveth upon the earth.” In accomplishing these divine purposes, he would frequently be exposed to great privations ; for as grass, and other inferior herbage, affording support to herbivorous animals only, are the sole productions of cold climates, man would be under the necessity of becoming carnivorous, until art and industry have rendered the soil of any newly inhabited part of the earth fruitful and productive. Plutarch, in reference to this, observes : “ And truly, as for those people who first ventured upon the eating of flesh, it is very probable that the sole reason of their doing so was scarcity and want of other food.” If, then, the original restriction as to food had not been relaxed, man, in obeying the impulses of nature to preserve his own life, would have broken the law of God ; but the moral

* Genesis vi. 12, 13.

† Genesis vi. 8.

‡ Genesis ix. 3, 4.

§ Some of my reviewers have adduced Peter's vision and other passages of Scripture, in vindication of the use of animal diet ; but as I have fully acknowledged that the use of animals for food was permitted after the Flood, I think it unnecessary to answer any such objections. I deprecate, as much as any one can do, all appeals to Scripture upon points which science is fully competent to decide, and have only referred to the historical portions for the purpose of showing what was the original food of man, and of marking the period when further latitude was granted him. If it can be shown that a fruit and farinaceous diet is most consistent with the physical, mental, and moral nature of man, and that it is nowhere forbidden in Scripture, this is all the sanction the vegetarian requires.

|| Genesis i. 28, and ix. 1.

and physical laws of an all-wise Creator are always in strict conformity with each other. Man was to increase, multiply, and replenish the earth, and subdue it;—to have dominion over all animals, in all climates: it is therefore consistent with all correct views of divine government to expect that he would receive such an organization from the divine hand as would render him capable of subsisting on the greatest variety of food,—the productions of all climates; with full liberty to use all such as he might be induced, by his instincts or reasoning faculties, to adopt, as circumstances might require. The flesh of animals, therefore, could not be excepted; for, in many climates, no other food could be procured.

21. But we are not thence to infer, that the digestive organs of man are the best adapted to an animal or even a mixed diet, (the contrary of which I hope to prove hereafter;) nor are we to conclude, that because animal food is permitted to man,³ therefore a more wholesome diet cannot be employed in situations where it can be procured. We must be careful to distinguish between divine permission and divine command: there is a kind of relative fitness in morals as well as in physics; and what may be convenient and lawful in certain circumstances, may be highly improper in others, or under a different dispensation.

[NOTE 3. No branch of the scriptural argument is so much harped upon by our opponents as this "*permission*" to eat flesh; yet, what is passing strange, these same *permissionists* will acknowledge that God has, in the plainest possible language, commended or ordained the vegetable kingdom as the source of man's sustenance. The permission to have a plurality of wives in ancient times might as well be alleged against the modern notion of every man having "*his own wife*." All permission to violate a natural, a social, or a moral law, is accompanied with the condition that the wrong-doer suffer the penalty. T.]

22. God has permitted evil to exist,—moral as well as physical; but man is not justified, as a moral agent, in causing either. The Pharisees, when objecting to the teachings of Christ respecting marriage, said: "Why did Moses, then, command to give a writing of divorcement, and to put her away? He saith unto them, Moses, because of the hardness of your hearts, suffered you to put away your wives; but from the beginning it was not so."* Under a former dispensation, a principle of retribution was admitted;—"an eye for an eye, and a tooth for a tooth;"—"to love

* Matt. xix , 8

our neighbor and hate our enemy ;" but now we are commanded " to love our enemies, to bless them that curse us, to do good to them that hate us, and to pray for them that despitefully use us and persecute us." David, Solomon, and others, were permitted a plurality of wives and concubines ; but the Mediator of a better covenant ordains otherwise for his followers. Things may be lawful that are not expedient ; and man may be allowed the use of what might be to his advantage and happiness to reject. Throughout the Scriptures we shall find the dispensations of God suited to the circumstances of His people ; and the language in which His servants communicate His will, and a knowledge of His works, always condescendingly adapted to the information and mental capacity of those for whom it is intended. " I have yet many things to say unto you," observes the Saviour, " but ye cannot bear them now." Upon a careful examination of Scripture, we shall find that all things connected with man's duty to God and his neighbor are revealed in such clear and simple language, " that a wayfaring man, though a fool, shall not err therein ;" but, with respect to meats and drinks, man is left to the guidance of those instincts and mental faculties with which he is endowed, with full permission to use all the " good creatures" of God as his wants may dictate ;—due regard being paid to mercy, truth, benevolence, moderation, and sobriety.

23. Without any disparagement to the cause of vegetable diet, therefore, it may be conceded, that animal food was permitted after the Deluge, when " men began to multiply on the face of the earth." But long after this event, the Patriarchs and their descendants confined themselves principally to a vegetable diet ; for fruits, honey, milk, butter, bread, and some simple preparations of seeds and mild herbs, were the plain, healthful food of the people for many ages afterwards. On joyous and festive occasions the fatted calf was killed ; but their usual diet was derived from the vegetable kingdom, and the produce of their flocks and herds ; and, even to this day, the inhabitants of Syria, Mesopotamia, and other countries, live after the same manner.

24. Assaad Yokoob Kayat, a native Syrian, in a speech at Exeter Hall, (May 16, 1838,) remarked, that he had lately visited Mount Lebanon, where he found the people as large as giants, and very strong and active. They lived almost entirely on dates, and drank only water ; and there were many among them one hundred and one hundred and ten years of age. Burckhardt, also, in his remarks on the Bedouins, says : " Their usual fare (called *ayesh*) consists of flour made into a paste with sour camel's milk. This is their daily and universal dish ; and the richest sheik would think it disgraceful to order his wife to prepare any other dish, merely to please his own palate. The Arabs never indulge in animal food, and other luxu-

ries, except on the occasion of some great festival, or on the arrival of a stranger. If the guest be a common person, *bread is baked* and served up with *ayesh*; if the guest be a person of some small consequence, coffee is prepared for him, and also the dish called *behatta*, (rice or flour boiled with sweet camel's milk,) or that called *fleta*, (baked paste, kneaded up thoroughly with butter;) but for a man of some rank, a kid or lamb is killed."

25. In process of time, however, the use of animal food became much more prevalent, particularly in temperate and cold climates; and there is every reason to believe that cruelty, immorality, and disease, marked the progress of man in this unnatural diet. This period is characterized by the poets as the brazen and iron ages, when—

"Truth, modesty, and shame the world forsook;
 Fraud, avarice, and force, their places took.
 Then sails were spread to every wind that blew;
 Raw were the sailors, and the depths were new:
 Trees, rudely hollowed, did the waves sustain,
 Ere ships in triumph ploughed the watery plain,
 The land-marks limited to each his right,
 For all before was common as the light;
 Nor was the ground alone required to bear
 Her annual income to the crooked share;
 But greedy mortals, rummaging her store,
 Dugged from her entrails first the precious ore,
 (Which next to hell the prudent gods had laid,)
 And that alluring ill to sight displayed.
 Thus cursed steel, and more accursed gold,
 Gave mischief birth, and made that mischief bold
 And double death did wretched man invade,
 By steel assaulted, and by gold betrayed:
 Faith flies, and piety in exile mourns;
 And justice, here oppressed, to heaven returns.*"

26. The various changes to which the earth and its inhabitants have been subjected, are alluded to in the fables of Chaos, Tellus, (or Terra,) Cœlus, Oceanus, Hyperion, Rhea, Japetus, Saturn, Jupiter, Prometheus, &c.

27. Prometheus (Προμηθεύς)—one who uses forethought, a contriver—is represented as having stolen fire from heaven, (which would be necessary to render animal food at all palatable to man;) for which crime he was chained to Mount Caucasus, where a vulture continually devoured his liver, which was never diminished, but continued to increase as it was fed upon. Hesiod says that, before the time of Prometheus, mankind were exempt from suffering, enjoying a vigorous youth; and that when death did arrive, it was

* Metamorphoses, Book i, L. 165.

without pain, and the eyes were gently closed as in sleep. Horace, in alluding to the theft of Prometheus, observes :

"Thus, from the sun's ethereal beam,
When bold Prometheus stole the enlivening flame,
Of fevers dire a ghastly brood
(Till then unknown) the unhappy fraud pursued ;
On earth their horrors baleful spread ;
And the pale monarch of the dead,
Till then slow moving to his prey,
Precipitately rapid swept his way."*

28. Mr. Newton, the author of the "Return of Nature," gives the following interpretation of this fable, in which Prometheus is thought to represent the human race :—"Making allowance for such transposition of the events of the allegory as time might produce, after the important truths were forgotten which this portion of the ancient mythology was intended to transmit, the drift of the fable seems to be this : Man, at his creation, was endowed with the gift of perpetual youth ; that is, he was formed not to be a sickly, suffering creature, as we now see him ; but to enjoy health, and to sink by slow degrees into the bosom of his parent earth, without disease or pain. Prometheus first taught the use of animal food (*primus bovem occidet Prometheus*) and of fire, with which to render it more digestible and pleasing to the taste. Jupiter, and the rest of the gods, foreseeing the consequences of these inventions, were amused or irritated at the short-sighted devices of the newly-formed creature, and left him to experience the sad effects of them. Thirst, the necessary concomitant of a flesh diet, perhaps of all diet vitiated by culinary preparations, ensued ; water was resorted to, and man forfeited the inestimable gift of health which he had received from Heaven ; he became diseased—the partaker of a precarious existence ; and no longer descended slowly to his grave."†

29. Hallé, in his "Hygiène," entertained the opinion here advocated, respecting the various articles successively employed as human food. "Moses, in his history of the world," says he, "describes the different substances which man successively included in the range of alimentary matter. He represents him as at first faithful to reason ; then transgressing the rules which it prescribes ; obedient to the laws of necessity, but yielding to the charms of pleasure with too faint a resistance ; satisfying his hunger with the fruits with which the trees in a happy climate abundantly supplied him ; then with the herbs and corn which he obtained from a more avaricious earth, as the reward of his labors ; with the milk of his flocks ;

* Francis' Horace, book 1, Ode 3.

† Return to Nature, p. 9.

and, finally, with their flesh : subjecting, also, the juices of vegetables to the process of fermentation ; and extracting from them liquors which recruit his exhausted strength, but which, when indulged in to excess, intoxicate and deprive him of reason. He exhibits to us the duration of life diminishing in proportion as he created to himself new wants."

CHAPTER II.

INFERENCES FROM THE ORIGINAL INNOCENCE OF MAN.

30. HAVING adduced all the evidence I have been able to find, in sacred and profane history, respecting the primitive diet of man, I shall now proceed to show that the state of innocence in which man was created is a strong argument in favor of vegetable diet. We are told that "God created man in his own image ; in the image of God created He him." (Genesis i. 27.) Now, where shall we find this divine image, except in that state of innocence and moral perfection in which man originally existed? Upright in mind, holy in heart, and righteous in action, the very thoughts of killing or of cruelty could find no place in him. At peace with the whole animated creation, his presence would excite neither the fears of the timid nor the resentment or ferocity of the strong. The dominion he held over every living thing would be regulated by benevolence and kindness ; mercy would restrain him from doing injury to any one of the animals by which he was surrounded ; pity would move him to relieve every appearance of distress or pain ; a universal sympathy would characterize all his actions ; and his supreme pleasure and enjoyment would consist in serving his God and in rendering all creatures endowed with life and sensation happy and contented. The delicious fruits of Paradise would abundantly satisfy every craving of appetite ; and no motive could exist in his pure mind for shedding blood or inflicting pain. "Before the Deluge," says Bossuet, "the nourishment which men derived from fruits and herbs was doubtless a remnant of the primitive innocence and gentleness in which we were formed."

31. Even in our degenerate state, the man of cultivated moral feeling shrinks from the task of taking the life of the higher grade of animals, and abhors the thought of inflicting pain and shedding blood ; how much

more, then, would purer minds and more feeling hearts be moved by the agonies and quivering limbs of creatures slaughtered for their appetite? While the state of innocence continued, the dominion of man over the animated creation was regulated by love and kindness; but when he had lost the image in which he was created,—when a perverted appetite and a selfish principle prevailed against the dictates of reason and benevolence,—when blood had stained his hands, and guilt had hardened his heart,—when repeated acts of cruelty to dumb animals had blunted his feelings, and feasting on their flesh and blood had inflamed his passions,—in short, when immorality and violence had deluged the earth, then was he permitted to rule with a rod of iron, where before he had swayed the sceptre of peace; and the language of Deity was—"The fear of you, and the dread of you, shall be upon every beast of the earth, and upon every fowl of the air, and upon all that moveth upon the earth!" (Genesis ix. 2.)

[NOTE 4. An eminent divine, in the course of a sermon lately delivered in a neighboring city, asked the significant but not uncommon question, "Who would want to have his son a butcher?" And why not? If the slaughtering of animals for food is the brutalizing and demoralizing occupation it is so generally represented to be, no one should pursue it. And if the butchery is wrong, I cannot understand how those who patronize the wrong by eating the flesh of the slaughtered animals can absolve themselves from the charge of being accessaries in wrong-doing. T.]

32. But I need not dwell longer on this part of the subject, as, I believe, all whose feelings have not been greatly corrupted by habit will conclude that the taking of life would have been highly revolting to the minds of the first race of mankind; and as our feelings are a part of our better nature, and the impress of divine power and wisdom, we may rest assured that an all-wise Creator would not have rendered a diet necessary to our health and happiness, which must be obtained by doing incessant violence to our sympathies.

33. Some there are who doubt or deny that man was either created in this state of high moral perfection, or that he was wise and intelligent. They believe that his condition has been progressive from rude barbarism to the refinement of civilized life. It would probably, therefore, have had greater weight with such persons if I had considered the race of man to be shadowed forth by his history as an individual from infancy to manhood, commencing with instinctive suggestions and terminating with a high state of intellectuality and moral rectitude. This might have led to a very different arrangement of the subject, but we should have arrived at the same

conclusions. All natural evidence respecting human diet, and all influences and motives directing man in the choice of his food, would be elicited by contemplating him in the threefold character of an instinctive, a self-interested, and a rational being. We shall find, upon careful examination, that each of these three motive-powers urge man in the same direction, not only as regards food, but as to all other means of producing health and happiness. We are to suppose, then, that man did not originally possess what we call knowledge—the fruit of long experience, and of a careful and long-continued observation of the laws of nature, or the result of ratiocination,—but that his perceptions, feelings, and actions, (being uncontrolled by acquired knowledge, artificially-formed habits or gross selfishness,) were intuitive, and, therefore, perfect as far as they extended; such as those we observe in the bee and many other animals, whose achievements frequently surpass those of man enlightened by reason. We must also admit, what few scientific and candid inquirers will be disposed to deny, that man is indigenous to the warmer regions of the earth, where fruits, his natural diet, as we shall shortly find, are most abundant and in greatest perfection. From a careful comparison, therefore, of man's instincts, his organization, his native climate and other related circumstances, we shall be justified in concluding that, though neither learned nor scientific, it is highly improbable he would be savage, ferocious, or immoral: these debasing qualities are the offspring of scarcity and selfishness,—the fruitful sources of almost every vice. Before mankind began to multiply on the earth in a favorable climate, their wants would be few; and, fruits of delicious flavor being plenteously supplied, there is every probability that they would be simple and innocent in their habits and manners; mild, frank, and generous in their conduct towards each other;—and that they would practise, from native impulse, all the more general virtues which we learn as matters of duty or expedience. At this period they would be uncontaminated by the envy, strife, malice, treachery, and cruelty which too frequently characterize a life of constant competition in *civilized society*; where “each seeks his own,” regardless of the wants, and frequently of the rights of his neighbor. In each state of society there is plenty for all; but, in the latter, an individualizing and ambitious spirit leaves enough to none. As an instinctive being, then, man would be directed by the senses of sight, smell, and taste, to fruit as his natural diet; (Chap. III.); and his social and sensitive feelings would deter him from killing animals and feeding on their flesh, so long as he was able to meet with more congenial food. But, however instinctive and mechanical man may have been originally, it is evident that he was not to remain in this state, but to become a rational and account-

able being. He must eat "of the tree of knowledge of good and evil;" he must learn wisdom and "obedience from the things which he suffers," and acquire his knowledge by painful experience, careful observation, comparison and analogy. The first fruit of knowledge (I will not say of wisdom) is to concentrate all care upon self; but a more enlarged experience teaches man that it is his true interest to share his possessions, first with "wife, children, and friends," and then to extend his benevolence to the whole human race. His motives to action are, in this state, of a utilitarian character, and *cui bono?* is the preface to all his exertions. As he advances in true wisdom, he discovers what is truth, and learns to practise it, not from self-interest, but from a regard to duty.

34. Thus have we seen that man may, originally, have been innocent, done justly, loved mercy, and walked obediently, because he had no motive to act otherwise; he gradually learns the same from a perception of self-interest, and finally from the highest motive that can actuate him, a conscientious regard to truth and duty; and under these three heads might have been arranged all the arguments which appear in this work in favor of a vegetable diet. By a primeval or natural state, however, we must not understand a state of barbarism, such as we witness in various degraded races of mankind at the present day; but a state wherein climate, productions, &c., are perfectly adapted to the organization of man, and antecedent to the conventionalities and corruptions of society.

CHAPTER III.

INFERENCES FROM THE SENSATIONS OF SIGHT, SMELL, AND TASTE.

35. THE intimate relations that exist between the organs of sense and food will be considered more at large when treating of the *natural food* of man; and I shall here merely refer to those more obvious relations which would influence man in his primeval state.

36. In all matters connected with organic life, comprehending the preservation of existence and the propagation of the species, man is directed by similar instinctive feelings, and governed by the same general laws, as inferior animals. Sensations yielding pleasure, without any intervention

of reason, infallibly direct him to the adoption of the means best adapted for securing his well-being; and painful or disagreeable sensations constantly warn him of danger and impending destruction. No superior intellectual endowment, no scientific research could so effectually and so instantaneously direct man to the best means of self-preservation. These observations particularly apply to the selection of food suitable to his peculiar organization, and best adapted for assimilation. Man, when originally created, would, doubtless, be devoid of all information which we know to be the result of long experience; but food would, be immediately necessary for renewing his constantly wasting structure: how then could he be directed to the most suitable aliments, but by the senses of sight, smell, and taste? But even if we grant that man was created with an extensive acquaintance with the properties of other bodies; supposing him to have possessed considerable chemical, physiological, anatomical, and other knowledge; yet even these endowments would have been a poor substitute for those instinctive feelings by which other animals are directed in their choice of food; and the most scientific philosopher, without these instincts, would, if an unusual article of diet were placed before him, be surpassed by an unenlightened rustic, who depended upon the simple suggestions of the senses.

37. Reason and science are insufficient even to remind man when supplies are necessary to recruit his strength and renew his structure; and without the sense of hunger as a monitor, man would be constantly endangering his life, by neglecting his daily food. Three senses are therefore absolutely necessary to the continued existence of all animals; one to render them conscious of the demands of nature, another to direct them to their food, and a third to test the qualities of the food when in contact.

38. "It cannot be too often repeated," observes Mr. Sidney Smith, "that none of those necessities which an animal requires are ever left to reason or to mere perception of utility. The superstructure and basis of humanity is animalism. Man lives before he thinks; he eats before he reasons; he is social before he is civilized; loves even against reason; and becomes a Nimrod long before he is a Nestor. Had man not been an animal before he became rational, he would not have existed at all. Reason is evidently the last care of nature. She first secures existence, and then finds leisure to think. She begins with enduing man with the faculties necessary to enable him to provide for himself, before she ventures to animate him with the sentiments which dictate to him to look abroad for the health of others; and she bids him provide for others before she allows to him that high ad-

vance in reason which gives him leisure to indulge in the mere exercise of intellect."

39. Upon the instinctive feelings, then, mankind must have originally depended for direction in the selection of appropriate diet; and can we suppose, judging even from our own perverted sensations, that man would be tempted by the sight of other animals to kill them for food? There is "beauty in them," it is true; their shape, symmetry, and motions delight and please us; but there is no such beauty as is calculated to excite the appetite while they are *living*, much less when *dead*. But suppose an animal to have been killed, either by design or by accident, and that its skin had been removed—would this be a sight calculated to excite desire, or would the smell and taste be gratified by such an object? Rather would not the sensations arising from these organs excite horror and aversion; and "in a warm climate, where putrefaction immediately succeeds dissolution, must not the dead flesh have speedily diffused an offensive odor, and occasioned insuperable loathing and disgust?"

40. Judging from instinctive feelings, therefore, we must conclude, that man could not have been originally carnivorous; for the mangled and gory limbs of a dead animal are not calculated to gratify the sensations of either sight, smell, or taste. What objects, then, without artificial preparation, would be most likely to have yielded pleasurable sensations to each of these senses, when the calls of hunger demanded satisfaction? Would the grass of the field be sufficient for this purpose? The herbivorous animal is attracted by the sight of a verdant lawn, and the sensations of smell and taste are there equally gratified; but this is not the case with man. Food of a higher character was designed for him. Moses informs us that "out of the ground made the Lord God to grow every tree that is *pleasant to the sight* and good for food;" (Genesis ii. 9;) and again, "When the woman *saw* that the tree was good for food, and that it *was pleasant to the eyes*, and a tree to be desired to make one wise, she took of the fruit thereof, and did eat; and gave also unto her husband with her, and he did eat." (Genesis iii. 6.) Thus we find that the organ of sight was the first to direct Eve in the choice of food; and that fruit was in this respect most attractive. No other kind of diet, in its natural state, is so calculated to afford pleasure to three out of the five senses with which man has been endowed. The eye is pleased with the varied forms and hues of the fruit of genial climes, and fruit yields a fragrance to the olfactory nerves not to be surpassed; while luscious juices and rich flavors render the sensual enjoyment complete. Fruit, then, would doubtless be best calculated to attract the notice of mankind; and upon this they would be induced, by every instinct of their

peculiar organization, to make their repast; until either scarcity, change of climate, or other causes, reduced them to the necessity of adopting a diet less congenial to their nature, and less conducive to their happiness.

CHAPTER IV.

PREPARATION OF ANIMALS FOR FOOD.

41. THAT man has succeeded, by art, in making the flesh of other animals agreeable to the senses of sight, smell, and taste;—that he has rendered it also both digestible and nutritious,⁵ cannot be questioned; but the comparative advantages of this and a vegetable diet will be more fully considered hereafter; my present arguments merely applying to a state of society far antecedent to the discovery of fire, and the invention of cooking and culinary utensils.

[NOTE 5. This proposition cannot be admitted without qualification. It may be questioned whether any form of cooking can render flesh-meat more nutritious or digestible in the absolute sense. It is very true that many persons in civilized society have artificial or decayed teeth, neither of which are well adapted to the mastication of raw flesh; hence, with such persons, cooked flesh well masticated might digest more comfortably than uncooked flesh with little or no mastication. Again, the revolting appearance of raw flesh might, when first presented to the senses of taste and smell, so disturb and nauseate the stomach as to seriously impair for a time the digestive functions. But I am of opinion that raw flesh, well masticated, would prove as much more nutritious and digestible than cooked in the case of the human, as it is with the lower animals, after the senses had been thoroughly accustomed to it. T.]

42. How soon man became acquainted with fire and its various uses, neither sacred nor profane history assists us in determining. Cain and Abel brought offerings unto the Lord, but there is no allusion to their using fire; nor are we justified by any expression made use of on that occasion, in inferring that this element was then employed to consume the offerings. The first mention of it occurs, I believe, when Abraham was about to offer up his son Isaac, long after the Flood, and when flesh was allowed as an

article of diet. I have previously alluded to the fable of Prometheus stealing fire from heaven; as well as to his being the first to make use of animal food, and to the diseases he entailed upon himself and mankind by so doing; instead, therefore, of vainly searching farther for the date of the discovery, it may suffice to observe, that until man was acquainted with fire, and familiar with its effects, it would be impossible for him to relish the flesh of other animals, particularly if fruits and farinaceous articles of diet were within his reach; and I believe no instance can be adduced of any nation, however savage, feeding upon raw flesh, where fruits, farinaceous roots, and corn could be procured. Have we not here, then, another strong argument in favor of the fruit and farinaceous diet of man, during the first period of his existence?

43. Another physical reason presents itself for considering man not to have been originally carnivorous;—namely, the want of implements for slaying, cutting, and preparing other animals, before he could make use of their flesh for food. All animals destined for feeding upon flesh are provided by nature with instruments for catching, tearing, and devouring their prey; but for man there is no such provision;—a plain indication that, previously to the discovery of the arts, he must have been indebted to some other productions for his subsistence. “God hath made man upright; but they have sought out many inventions.” (Eccles. vii. 29.)

44. I have now completed my investigations respecting the original diet of man; and have, I trust, satisfactorily proved, that the flesh of animals was not laid under contribution for his support. The language of Scripture seems to me particularly clear and decisive on this point, showing that fruit and other vegetables were appropriated to the use of man. His original innocence and moral perfection speak the same language; for the thought of creating pain and misery, by slaughtering an animal in the midst of pleasure and enjoyment, could arise in no breast whereon the image of the Creator was faithfully sealed, except in the case of dire necessity. The testimony of profane antiquity, also, is in favor of a simple vegetable diet among the first races of mankind. The senses of sight, smell, and taste, the instincts expressly designed by the Creator for directing each animal to its appropriate food, loudly proclaim man to have been originally frugivorous; while the absence of fire and other results of discovery would entirely preclude the first human inhabitants of this globe from feasting upon the flesh and blood of slaughtered animals.

45. Whatever source of evidence we consult, therefore, no discrepancy is found. Revelation and tradition, morals and man's sensitive feelings, nature and art, all harmonize in declaring that man, when fresh from the

hands of his Creator, when he lived in innocence and peace, when he was blessed with happiness, health, and vigor, for many hundreds of years, and before a gross selfishness had corrupted and degraded his nature, lived upon the simple productions of the earth.

PART II.

NATURAL FOOD OF MAN.

PART II.

NATURAL FOOD OF MAN.

CHAPTER I.

EVIDENCE AFFORDED BY COMPARATIVE ANATOMY.

*Felix, qui potuit rerum cognoscere causas;
Quos rami fructus, quos ipsa volentia rura
Sponte tulere sua, carpit.*—VIRGIL.

46. I HAVE previously stated, that the intellectual faculties of man have afforded him the power to resist, and greatly to modify, his instinctive suggestions. His inventive powers enable him to substitute the discoveries of art for the simple and more wholesome provisions of nature. Daily use and pleasing associations render him capable of enjoying, with the greatest gust and delight, substances which were originally distasteful, or even repulsive to his palate; (138;) and those articles of diet which, to an unvitiated taste, yielded the greatest enjoyment, become tasteless and indifferent.⁶ Thus are the natural wants supplanted by numerous artificial ones, which, becoming associated with the former, are not to be distinguished from them; and thus is man, by the refinements of luxury, the requirements of fashion, the habits of modern society, the influence of example, and the force of habit, plunged headlong into an abyss of artificial pleasures, and disqualified for relishing the simple aliments which nature had adapted to his original instincts, and to the highest development of his physical and moral powers.

[NOTE 6. A cow has been taught to love "kitchen-slops" strongly impregnated with refuse and putrefied animal matters, in preference to her natural food; and a sheep has been feasted on beefsteak and coffee until it refused to touch the greenest grass or the most delicious clover. So, man

has depraved his instincts to that degree, that "rum and tobacco" have become his greatest luxuries. T.]

47. But those very intellectual endowments which conferred on man the ability to depart so far from his natural state, are able also to lead him back from his long wanderings, and to reveal to him the best means of securing his health and happiness. Ill health, pain, misery, and an abbreviated existence, are the means adopted by the Deity to remind us of our transgressions of nature's laws; and although our instinctive feelings are no longer competent to direct us in the path of health and peace, our cultivated reasoning faculties, by which we investigate and compare the laws of nature, and by which we are made sensible of the beautiful adaptation of means to an end, are fully sufficient for enabling us to retrace our steps. We may also rest assured, that the principles of sound philosophy will harmonize with the dictates of original instinct. God being the author of both, they cannot contradict each other; the laws of nature are but the expression of his will, and, as all his designs are for good, there is a moral certainty that a life passed in obedience to those principles will be productive of the highest degree of happiness that temporal objects can yield; notwithstanding the sacrifices and self-denial which an emancipation from previously-formed habits will undoubtedly require.

48. Let us, therefore, interrogate Nature, with a sincere desire of discovering the truth, and not with the object of defending what we wish to find true; let us employ the talents with which God has endowed us, not in accumulating wealth, not in fostering and expanding the selfishness of human nature, but in discovering the real causes of disease and misery, and the best means of establishing durable health and happiness. With this view, let us now attempt an answer to the second question; namely Is man so wonderfully constructed, that climate and locality alone determine on what substances he shall feed? Or does his organization, like that of other animals, manifest a special *adaptation* to one specific kind of food; but with an extensive range of *adaptability* to the greatest variety of animal and vegetable productions?

49. That the alimentary organs of man are so constructed as to admit of his feeding on a great variety of animal and vegetable substances, as climate and circumstances may direct, and yet enjoy a tolerable amount of health, happiness, and longevity, there can be no doubt; and the advantages of such a range of capability will hereafter be referred to.

50. Hence it is that climate, in most cases, determines the diet upon which any particular nation or people subsist; and many have been induced to conclude, that climate and its productions should prescribe the rule

by which the diet of man ought to be regulated. "In the torrid regions of the globe," say they, "where a variety of rich and juicy fruits, rice, &c., abound, and where gregarious animals, such as sheep and oxen, are scarce, or of an inferior description, there it is evidently intended that man should feed on vegetable productions, and his health is best preserved by them: but in colder climes, where the circumstances are reversed, animal food should form the chief part of human diet. These are the evident intentions of nature." The argument is plausible; and, as the majority of a nation practically adopt the diet that seems purposely provided for them, without ever being led to suspect they are in error, or to investigate the matter on anatomical and physiological grounds, it is concluded, that public practice is the result of experience, and consequently the best: the more rational inference is, that expediency in the first place, and habit in the second, have reconciled man to the food he usually feeds on; and his alimentary organs are so peculiarly constructed as to accommodate themselves easily to his circumstances. But when the structure and functions of the various human organs employed in the prehension, mastication, and digestion of food are considered, it is clear they have a special adaptation, in obedience to which all the interests and happiness of man are most effectually promoted; while, at the same time, they possess a wider range of capability, which permits him to feed on the greatest variety of animal and vegetable productions, without destroying his life, or materially interfering with his pleasures.

51. There are few who doubt that fruits, &c., were the original food of man; and I trust the evidence already presented will tend to produce conviction in the minds of those who have not previously thought upon the subject. Now, if such was the original diet of man, it is certain that the Divine Being must have provided him with such an organization as was better adapted to the solution and assimilation of vegetable matter, in the form of fruits, roots, grain, &c., than any other alimentary matter: to suppose otherwise would be to admit a defect in the plans of Omniscience, which we invariably find "ordered in all things and sure." It devolves, therefore, upon those who maintain that man was *originally* frugivorous but not so *now*, to show that his organization has, since his original creation, undergone some change. This, of course, they cannot do; and I shall now endeavor to prove, that the organization of man is precisely of the nature we should expect a frugivorous creature to possess.

52. Without a comparison of the natural dietetic habits of animals, anatomy supplies us with no internal evidence of the characteristic food of any particular species. It is necessary, therefore, that the naturalist

should classify the animal creation, according to the food they are observed to feed upon; and then the anatomist marks the minute differences in their structure, and ascertains that all carnivorous animals have alimentary organs of a particular character, and all herbivorous animals those of a totally different kind. The naturalist and anatomist having mutually aided each other by their respective observations and discoveries, and determined the established laws of relation, comparative anatomy enables us to ascertain the natural dietetic character of those animals whose natural history is unknown.

53. Between the organs of digestion, of motion, and of sensation, there is so direct and intimate a relation, and so beautiful a harmony of parts, that from the appearance of a single bone or any other characteristic part, a skilful naturalist will often be able to describe, with considerable exactness, not only the form of the skeleton, but even the dietetic habits of an extinct species. A piercing eye, a keen scent, swiftness of foot or wing, strong talons, powerful muscles, sharp angular teeth or a crooked beak, a simple stomach, a short alimentary canal, great cunning and a treacherous and cruel disposition, generally characterize the carnivorous animal; and the remark applies universally to mammalia, birds, reptiles, fishes, and insects. The herbivorous race is, for the most part, distinguished by organs and qualities the reverse of all these; and so consistent is nature in all her work, that we never find an animal with organs of a rapacious character in one part of its structure, and those of an opposite class in another part. For instance, the claws of the tiger are never combined with the stomach and intestinal canal of the sheep or the camel. All the divisions of an animal's economy are wisely adjusted to each other: perfection and unity of design mark every organ, and fit it for the function it has been destined to perform. Let us, therefore, wisely consider these workings of divine wisdom, and carefully note the lessons they are intended to teach us.⁷

[NOTE 7. This branch of our argument is never appreciated by the superficial reader. The different portions of the digestive apparatus are often represented as affording the evidence to be deduced from comparative anatomy. But to my mind the whole organization of the different classes of animals, considered in relation to their dietetic habits, presents a still more conclusive argument in favor of the frugivorous character of man. A pictorial glance at a few specimens of these several classes cannot fail to give us a vivid and impressive idea of the teachings of natural history on the subject.

I have often thought that, if a few animals, however promiscuously selected, were grouped according to their natural dietetic characters, we should have an ocular and a convincing demonstration to which class man *naturally* belongs.

As a fair representation of the general bodily conformation of the carnivorous division of the animal kingdom, look at the bull-dog, jackal, alligator, and tiger. (Figs. 1, 2, 3, and 4.)

FIG. 1.



BULL-DOG.

There are, of course, a variety of smaller and larger animals which present the carnivorous organization in a still more striking aspect, as the spider, vulture, anaconda, shark, hyena, &c., whose history and habitudes are familiar to all naturalists. If any attribute of character, bodily or mental, stands out prominently in form, limbs, features and expression, it is that of unmistakable and unmitigated ferociousness. On every part of the organization a predacious or bloodthirsty nature seems indelibly stamped; and this "language of signs" is universally understood by the animal kingdom.

"Gloomily retired,
The villain spider lives, cunning and fierce,
Mixture abhorred! Amid a mangled heap
Of carcasses, in eager watch he sits,
O'erlooking all his waving snares around."

But why should poets, and divines, and all men of refinement and intelligence, attach the ideas of villany and cruelty to the killing and eating of

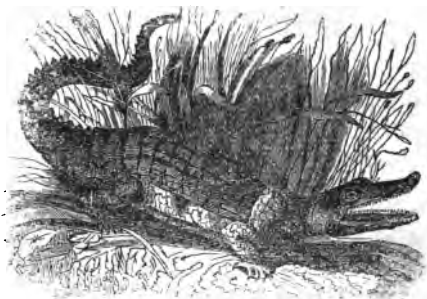
FIG. 2.



JACKAL.

animals amongst the insect tribes, if the highest development of the human being requires him to obtain a part of his sustenance in a similar manner?

FIG. 3.



ALLIGATOR.

Is there not as much of treachery and fierceness, to say nothing of villany and cunning, in slaughtering and devouring a pet lamb, or an innocent calf, as in catching and eating flies?

FIG. 4.



TIGER.

In Figs. 5, 6, 7, and 8, we have a group from the omnivorous department of the animal kingdom. The general expression of organization has cer-

FIG. 5.



BROWN BEAR.

tainly less of fierceness and maliciousness, yet the evidences of grossness and stupidity are even more prominent.

It is true that the hog, in its domesticated condition, is a much more

FIG. 6.



HIPPOPOTAMUS.

filthy animal than in its native forest; and the bear, when left to its own dietetic instincts, is, compared with the domesticated hog, of cleanly habits; the argument, therefore, that the inhabitants of new countries are very

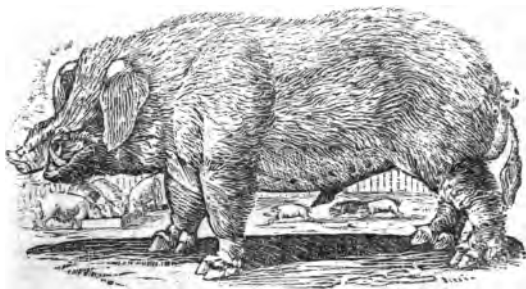
FIG. 7.



RAT.

well nourished on "bear-meat," has very little force when applied to the flesh of the equally omnivorous but artificially-fattened swine. The flesh of all animals is rendered worse by confinement, and, as food, still further deteriorated by the fattening process.

FIG. 8.



HOG.

I cannot here forbear alluding to an improved dietary which has recently been proposed by the French Academy of Medicine, and echoed through

FIG. 9.



DEER.

the medical journals of this country, for the treatment of the disease called *diabetes*. This improvement consists in feeding the patient on the

flesh of carnivorous animals—cats, dogs, foxes, &c.! And in order to conquer the “prejudice” which the patient’s mind or palate may be supposed to entertain against the ensanguined nutrition, it is further proposed to season it abundantly with brandy and spices! Such “discoveries” in medical science are much better calculated to carry us back to the dark ages, than to lead to any useful results in the future.

Figs. 9, 10, 11 and 12, represent a group of the herbivora. In all these, and, indeed, in all herbivorous animals, the limbs, mouth, features, expression, and, in short, the entire organization, is in striking contrast with both the carnivorous and omnivorous groups. Here gentleness,

FIG. 10.



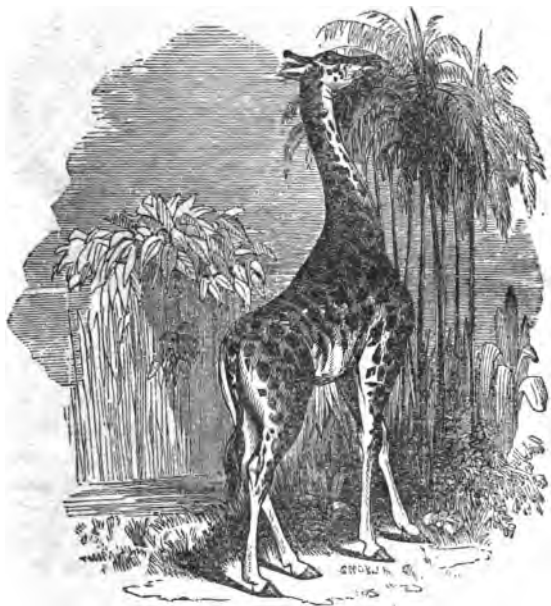
ZEBRA.

peacefulness, and innocence are the prominent traits of character. The mental constitution of the herbivora is as well distinguished from the carnivora and omnivora, as is the bodily conformation. With these, secretiveness and destructiveness are leading propensities; and with herbivora, cautiousness and combativeness. It is worthy of remark that the horse, the stag, the antelope, the bull, &c., will contend to conquer and subjugate; the wolf, the panther, the hyena, the shark, &c., tear and rend, to devour and annihilate.

In the herbivorous group, too, are the most hardy and enduring specimens of the animal kingdom; and this fact proves incontestably that, not-

withstanding great agility (resulting mainly from the development of particular sets of muscles by constant exercise) is compatible with an exclusively flesh diet, the greatest working power, and the most permanent strength and vigor, if not consistent with none other than an exclusively vegetable diet, are, at least, never found in connection with any other.

FIG. 11.

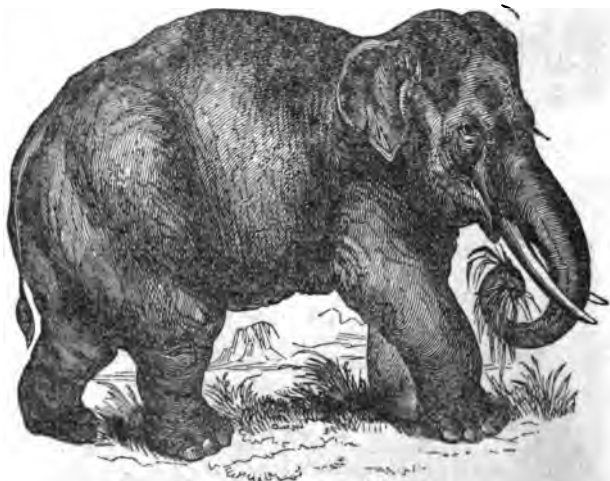


GIRAFFE.

Lastly, let us look at a group of the frugivora. The Galago, (Fig. 13,) which is found in some of the barbarous countries on the eastern coast of Africa, climbs upon the trees like the squirrel, and feeds upon gum and pulpy fruits. The appearance of its feet, resembling very strikingly the human hand, indicates an approximation to the samia or monkey tribes.

Figs. 14, 15, and 16, are those specimens of frugivorous animals which most nearly resemble the human form. It seems to me that, from the spider to the orang-outang, through those several groups of animals whose dietetic habits have been indicated, there is something like an ascending scale; and surely, whether the aliment on which the animal subsists has any

FIG. 12.



ELEPHANT.

determinate relation to its mental and bodily nature or not, it is clearly demonstrable that animals approximate humanity in form and feature very nearly in the precise ratio to their departure from the practice of flesh-eating. And if all this is a mere accident in the order of nature, it is certainly a most strange and wonderful accident!

But in order to complete the illustration, let us glance at specimens of the human race more nearly resembling, in dietetic habits, the several classes of animals we have been considering.

In Fig. 17 (p. 68) is seen a specimen of humanity as nearly carnivorous, perhaps, as can be found in this age of the world. His or *its* manner of life is very much after the ape or orang-outang style, and his principal food is the flesh of the opossum, which he catches by climbing the trees.

A single grade above the Australian in bodily symmetry and mental endowment, are the Tikopians, (Fig. 18, p. 69,) who inhabit the small island Tikopia. (See Pritchard's Natural History of Man.) In dietetic habits they resemble more nearly the omnivorous animals than the majority of the Australians, as they employ a greater proportion of vegetable food.

In Fig. 19 (p. 70) is seen a representation of a Kaffir of Bechuana, belonging to a race making a nearer approach, in cranial as well as general development, to the more cultivated tribes of the human family.

In general the Kaffirs are brave, high-spirited, rather warlike, but not cruel. They are described by travellers as intelligent and possessing acute sensibilities and perceptions; yet, from not having reflective education, they

FIG. 18.

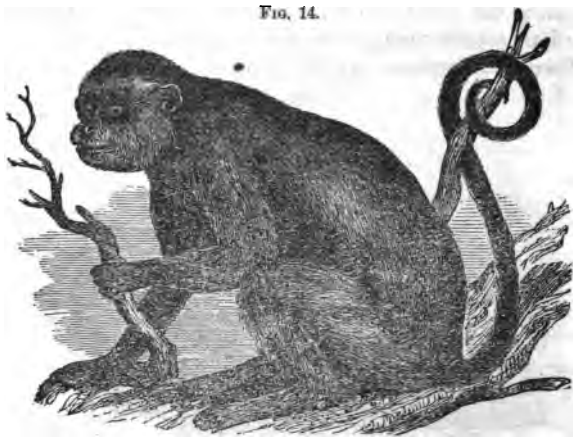


GALAGO.

are exceedingly superstitious. The combined influence of cunning, avarice and superstition, causes them to believe in witchcraft, and to resort to many barbarous devices to plunder those victims of suspicion who happen to possess property.

The Circassians and Georgians, though rude and unpolished tribes, are

FIG. 14.



MONKEY.

celebrated as among the handsomest people in the world. Pritchard remarks, "The Georgians are a people of European features and form."

FIG. 15.



APE.

Reineggs says that their women are more beautiful than the Circassians, but that the prevalent complexion of the race is not so fair as that of the Circassians, who are natives of the higher country of Caucasus."

Travellers and historians inform us that these people use very little flesh as compared with the barbarous and semi-civilized nations generally, and that in many places their fields, cultivated like gardens, supply them with ample nutritive material for an almost exclusively vegetable diet.

FIG. 16.



ORANG-OUTANG

We may find in various parts of the world, examples to illustrate the same principles, as well as the particular ones I have selected. Thus the Esquimaux, whose leading articles of food are animal flesh, fats and oils, exhibit a strong prevalence of the animal over the mental powers, and a correspondingly weak development of the moral sentiments and intellectual faculties. Dwarfishness of body, stupidity of mind, grossness of sense, with excessive alimentiveness, are the prominent characteristics of this animal man.

The Kalmuck Tartars are fair samples of omnivorous or all-devouring men-animals, with a preponderance towards the carnivorous. Although horse-flesh is with them a principal article of food, yet they eat indiscriminately of any other animal it is convenient to procure, with such vegetable food as comes in their way. Travellers uniformly represent them as hideous

FIG. 17.



A NATIVE AUSTRALIAN.

and revolting in feature and expression, and as gross in sensibilities and appetences as can well be imagined.

A higher grade of civilization is found in the Turk. The people of this nation evince a bodily organization and mental constitution superior to the

FIG. 18.



TIKOPIAN.

Esquimaux and Tartars, which I have made to represent the carnivorous and omnivorous man, and correspondingly we find their dietetic habits approximate toward vegetarianism.

If it be alleged as an argument against the positions I am endeavoring to illustrate, that the mild and amiable Georgians and Circassians are degraded and enslaved by their more ferocious and warlike neighbors, the

FIG. 19.



AN EASTERN KAFFIR.

Tartars and Turks, I can only reply that human beings may, and in fact do, like predacious animals, riot upon and tyrannize over the more amiable and more lovely, as the wolf preys upon the lamb, and the vulture upon the dove. And I can see no end or remedy for this seeming cruelty, save

FIG. 23.



GEORGIAN FEMALE.

in that law of benevolence and progress which permits suffering for a season, and as a means of development, and overrules all for good, by that law which, in due process of time, will not only exterminate from the face of the earth the beasts of prey, but also all the appetences of human beings for preying on other animals.

T.]

54. If the structure of any animal be of a character decidedly carnivorous or decidedly herbivorous, there is little difficulty in determining its place in the scale of creation; but "if we find, on careful and accurate examination, that the organs under our inspection are neither like those of carnivorous nor like those of herbivorous animals, we are to conclude that the animal whose they were belonged to neither of these orders; and if the animal belonged to an extinct or unknown species, the natural history of which is also wholly unknown, and cannot now be studied, all correct principles in comparative anatomy most clearly and decidedly demand that we should diligently explore the animal kingdom, and, if possible, find some type with which the organs under our examination correspond. But if no exact type of our specimen can be found, then we must ascertain in what order of animals alimentary organs are found most nearly resembling those of our specimen; and when this is done, we must conclude that the animal to which our specimen belonged came nearer to that order than to any other known order of animals, in its natural dietetic character; and in all that our specimen varies from that order, and approaches to a resemblance of some other known order, we are to conclude that the animal to which it belonged differed from the former, and approached to an agreement with the latter, in its natural dietetic character. But if we find an order, with the alimentary organs of which our specimen fully corresponds, then we are irresistibly led to the conclusion that the animal to which it belonged was of the same dietetic character with that order; and if now we can, by studying the natural history or observing the natural dietetic habits of that order, fully ascertain the natural dietetic character of the animals belonging to it, then we know the natural dietetic character of the animal to which our specimen belonged, just so far as the most rigorous correct principles and reasonings of comparative anatomy can teach us.

55. "Now, then, with the strictest application of these principles, and this mode of reasoning, to the question before us: What is the natural dietetic character of man, according to the real and true evidence of comparative anatomy? In considering this question, it is important that we should remember that, whatever may be true concerning the natural dietetic character of man, there is neither now on earth, nor has there been for many centuries, any portion of the human race, so far as we know, which have lived in all respects so perfectly in a state of nature, or in a state to which the constitutional nature of man is most perfectly adapted, as to afford us an opportunity to study the true natural history of man, and learn his natural dietetic character from his natural dietetic habits; and, therefore, so far as this question is anatomically considered, man must, in strict propriety, be

regarded as an extinct species ; because, though man is actually a living species of animals, yet the species, as a whole, have become so artificial in their dietetic habits, that it is impossible to derive from those habits any evidence which can justly be considered unquestionable, in relation to the natural dietetic character of man : and, consequently, our evidence and reasoning in the case must be precisely such as would be proper if man were really an extinct species, and his natural history wholly unknown.

56. "Let us suppose, then, that the alimentary organs of the human body are placed before us for examination, in order to ascertain the natural dietetic character of man. In the first place, those organs speak no distinct and unequivocal language ; afford no clear and determinate indications from which, without reference to any thing else, we can learn the natural dietetic character of man. In the second place, the purely natural dietetic habits of man are wholly unknown, except as a matter of extremely ancient history and tradition ; and we have now no way by which we can become acquainted with those habits from observation. From the nature and circumstances of the case, therefore, we are under the necessity of drawing our evidence from comparative anatomy, in the same manner as we would if the species were extinct and unknown. That is, we have no other way of ascertaining the natural dietetic character of man from his alimentary organs, than by comparing those organs with the alimentary organs of other animals in a pure state of nature : and if we can find an order of animals whose alimentary organs perfectly correspond with those of man, and can accurately and fully ascertain the natural dietetic habits and character of that order of animals, then have we learned, so far as we can learn from comparative anatomy, the true, natural dietetic character of man." Fully agreeing with these sensible remarks of Mr. Sylvester Graham,* I shall now proceed to compare the various organs of man employed in the prehension, mastication, insalivation, and digestion of food, with the corresponding organs of the carnivorous and herbivorous classes.

TEETH.

57. The teeth of the Mammalia are generally divided into four sorts : 1. Incisors, or Cutting Teeth. 2. Canines, Cuspids, or Eye-teeth. 3. Bicuspids, or small Cheek-teeth. 4. Molars, or large Cheek-teeth. In each human jaw there are sixteen teeth ; consisting of four incisors, two cuspids, four bicuspids, and six molars. These, in a perfectly normal state, form an uninterrupted series ; they are all nearly equal in length, and closely approximated in each jaw ; a character by which man is distinguished

* Lectures on Human Life, vol. II. p. 49.

from all other animals, excepting the fossil genus *Anoplotherium*, which is allied to the *Tapir* tribe.

58. The incisors in man are large, broad, and compressed, with a flat edge. In carnivorous animals there are six in each jaw: they are small and pointed, bearing no resemblance to those of man; standing, also, farther apart, and being comparatively unimportant. In herbivorous animals they are broad, as in man; but generally much stronger, with the cutting ends considerably thicker, but varying extremely, both in form and number. In the *Ruminantia*, there are no incisors in the upper jaw; and those of the lower one are flat, broad, and oblique, so as to oppose their upper surface to the callous gum above. In the horse they are large and strong; in the hog they are also strong, those of the lower jaw projecting obliquely. In the elephant there are no incisors in the lower jaw, and the two in the upper assume the form of huge cylindrical tusks. The *Rodentia* (such as the rat, beaver, &c.) have long curved incisors.

59. The cuspids, or canine teeth, assume their normal development in the *Carnivora*; and the term "*canine*" (from the Latin word "*canis*") indicates them to be especially developed in the dog. They are (when normal) longer than the other teeth, conical, acute, and strong; often compressed, and with a cutting edge behind: their number never exceeds one on each side in each jaw. In many animals, they are developed into huge tusks; as in the boar, &c. The cuspids being generally much longer than the other teeth, a considerable space usually exists between the teeth, on each side of the jaw, to receive the canines of the opposite jaw; and, in all animals, the lower cuspids are anterior to the upper ones. In the hedgehogs, shrews, phalangiers, and the tarsier, the canine are shorter than the other teeth; and, consequently, there is a vacancy between their points on each side. There is not the slightest resemblance between the cuspids of man and those of carnivorous animals; though the possession of these canines is the principal evidence urged by those who contend that man is partly carnivorous. Throughout nature, there are no sudden departures from the general type; and an organ which is strikingly characteristic in one class or order, disappears by successive gradations through several other orders, till it finally vanishes, or becomes merely rudimental. Such is the case with the canine teeth. In the *Carnivora*, they are strong and powerful weapons of offence and defence; in some of the *Herbivora*, as the horse, camel, and stag, they are still pointed and large;* in man they

* Rudiments of teeth are contained within the bodies of various kinds of serpents. In the young of the whale, before its birth, there is found in the lower jaw a row of small teeth, which do not rise above the gums, and can therefore be of no use for mastication. Their

are small, scarcely longer than the incisors ; and no space exists between the opposite teeth, for receiving the canines ; which is an exception peculiar to man. In him, therefore, the cuspids may be regarded as a form of transition between the incisors and bicuspidæ, and as having no reference whatever to a flesh-eating propensity. If, however, any one be disposed to hold an opposite opinion, in consequence of the existence of the canines in man, then (to be consistent) he must believe the horse, camel, and other species of *Herbivora*, to be still more carnivorous than he ; because the cuspids are longer in them than in man.

60. The bicuspidæ or false molars in man have two prominences, the outer one being generally somewhat more prominent than the inner. In the *Rodentia*, the *Ruminants*, the horse, and the elephant, there are no false molars. In carnivorous animals, they rise into high and sharp points, like saw-teeth, much larger and more prominent than those just described : they present nothing which approaches to a grinding or triturating surface ; but, like those which precede them, are fitted for tearing and cutting. In this order, they are subdivided into "carnivorous" and "tuberculous" molars ; the number of the latter diminishing, in proportion to the sanguinary habits of the species.

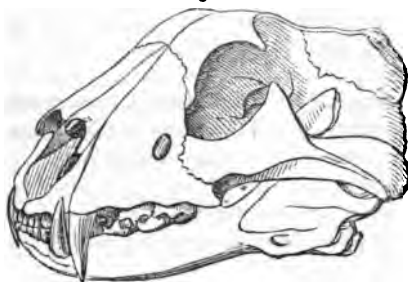
61. The molars of herbivorous animals have very large or oblong square crowns ; not, however, proportionately larger than those of man, but entirely different in structure. They are composed of alternate longitudinal plates of bone and enamel ; and the whole crown is surrounded with a plate of enamel, like human teeth ; the grinding surface, however, is not covered by enamel, as is the case with those of man and the *Quadrumana* ; but presents the uncovered ends of the alternate longitudinal plates of bone and enamel ; and the plates of bone, being much softer than those of enamel, wear away much faster in mastication ; so that the plates of enamel are caused continually to be more prominent than those of bone ; whereby a roughness is given to the grinding surface, which greatly increases its dividing and triturating power upon the grass, twigs, boughs, and other vegetable and woody substances, on which herbivorous animals naturally subsist. The cheek-teeth in the lower jaw of man, like those of herbivorous and frugivorous animals, are simply raised into rounded elevations ; and are directly opposed to those of the upper jaw, so as to mash

further growth is arrested, and they afterwards wholly disappear. Roget observes, that "an organ which has served an important purpose in one animal, may be of less use in another, occupying a higher station in the scale ; and the change of circumstances may even render it wholly useless. In such cases, we find that it is gradually discarded from the system ; becoming continually smaller, till it disappears altogether."

and grind the substances that come between them ; but not in the least adapted to the killing, tearing, and gnawing of animals. In the Carnivora they shut within those of the upper jaw, so as to tear and cut the flesh on which they feed, preparatory to its being swallowed : when both series are viewed together, the general outline may be compared to the teeth of a saw, and their action to that of a pair of shears.^s

[NOTE 8. Figure 25 is a correct representation of the teeth of a car-

Fig. 25.

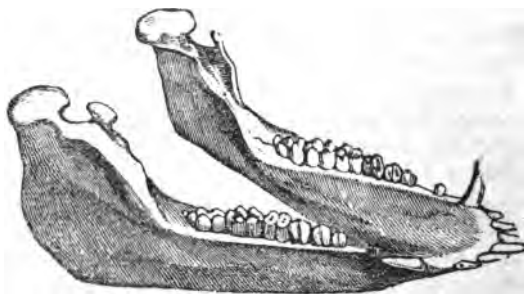


SKULL OF TIGER.

nivorous animal, the tiger, which are similar to those of all specimens of the feline race. They differ from human teeth in being pointed, jagged, and crossing, instead of an even height at the meeting surfaces. It is apparent at a single glance, that food cannot be finely ground or masticated by such teeth, but can only be cut and torn.

In Figure 26 are seen the teeth of an omnivorous animal. Here the jaw, as in the case of the Carnivora, is restricted to the opening and shut-

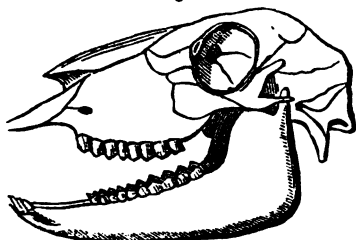
Fig. 26.



UNDER JAW AND TEETH OF THE HOG.

ting, or cutting and tearing motion ; all lateral or grinding motion being prevented by the great depth of the glenoid cavity, and by bony eminences before and behind.

Fig. 27.



SKULL OF SHEEP.

Next let us view, in Figure 27, the teeth of an herbivorous animal. Here we have a more even development of the upper or grinding surfaces; whilst the articulation of the lower jaw allows a free lateral and rotary motion, admirably adapted to the purposes of thorough mastication and insalivation of the food of the animal, as an examination of the teeth will readily show.

The teeth of a well-known frugivorous animal, Figure 28, certainly resemble those of the Omnivora, or even Carnivora, more than human teeth do.

Fig. 28.

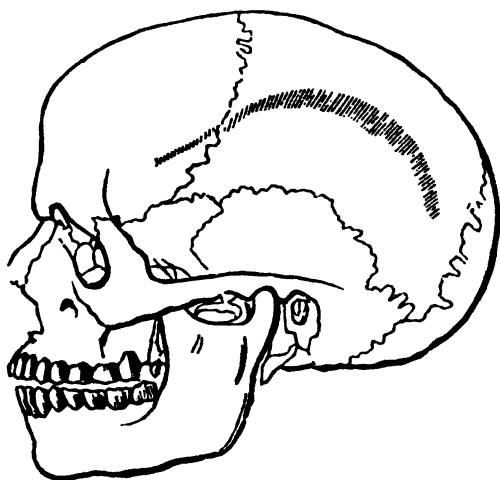


SKULL OF ORANG-OUTANG.

Following up the ascending scale with the comparative anatomy of the teeth, as we have done with that of the whole organization, we come lastly to the human, which, it is apparent at a glance, are farther removed from the carnivora than are those of the orang-outang. Those who will take the trouble to look closely at the evidences to be derived from comparative anatomy, will not wonder that all naturalists are agreed that the

organisation of the human being is clearly frugivorous ; however much they may marvel that medical writers and physiological authors should be con-

Fig. 29.



HUMAN SKULL AND TEETH.

tinually repeating the oft-exploded dogma that "the digestive apparatus of man is intermediate between the carnivorous and herbivorous animals, hence adapted to a mixed diet of animal and vegetable food," &c. T.]

ARTICULATION OF THE LOWER JAW.

62. All lateral motion of the lower jaw in the Carnivora is not only prevented by the structure of the teeth, and the closing of the lower cheek-teeth within those of the upper ; but is also rendered quite impossible by the rising edges of the glenoid cavity ; so that the articulation, or joint, admits of the opening and closing motion only ; thus rendering it more secure under the extreme muscular action to which it is frequently subjected. In herbivorous animals, the condyle is adapted to, and works upon, a wide and somewhat convex surface ; and, consequently, the articulation allows considerable lateral motion, for masticating the vegetable matter on which they feed. Great freedom of lateral motion is also possessed by the human inferior maxilla ; so that the food can be completely triturated by the grinding surfaces of the molars, before it is swallowed ; a charac-

ter evidently connecting man with the Herbivora and with the Quadrumana, which possess a similar articulation.

ZYGOMATIC ARCH ; TEMPORAL AND MASSETER MUSCLES.

63. The temporal and masseter muscles, by which the motion of the lower jaw is effected, are of immense size in carnivorous animals. The temporal muscle occupies the whole side of the skull, and fills the space beneath the zygomatic arch, the span and spring of which are generally an index of the volume of this muscle ; while the extent and strength of the arch indicate the development of the masseter muscle. On the contrary, the pterygoid muscles, which aid the lateral movement of the jaw, are extremely small. The zygoma is of great size and strength in the Carnivora ; consisting of a long process of the masseter bone, overlaid by the usual process of the temporal bone, which is equally strong. The arch extends not only backward but upward, by the bending down of the extremity ; the line of anterior declination falling precisely on the centre of the carnassière tooth—the point in which the force of the jaws is concentrated, and where it is most required for cutting, tearing, and crushing their food. In Ruminants, the zygomatic arch is short, and the temporal muscles are small ; but the masseter muscle on each side extends beyond the arch, and is attached to the greater part of the side of the maxillary bone. The pterygoid fossa is ample, and its muscles are largely developed. The arch is small in man, the temporal muscles moderate, and the force of the jaws comparatively weak.

SALIVARY GLANDS.

64. The food of all animals possessing the true molar teeth, requires due mastication, and mixture with the saliva, before it is passed from the mouth into the oesophagus ; and, for the secretion of this fluid, salivary glands are present in almost all animals, except the cetacea and fishes. In insects, they have the character of prolonged cœca ; and are very feebly developed in the amphibious Mammalia. They are numerous and large in those animals living on food which requires continued mastication, as in Ruminants ; and they are so situated, that the play of the muscles, in the act of chewing, communicates to them a proportionate stimulus. In the Carnivora, the food of which requires little or no mastication, these glands are very small ; and, consequently, the saliva is very limited in quantity. The salivary glands are not proportionably so large in man as in herbivorous animals, nor so small as in the Carnivora. It is also stated, that these glands are much more developed in those of our race who have long subsisted on vegetable food, than in those who have lived chiefly on animal

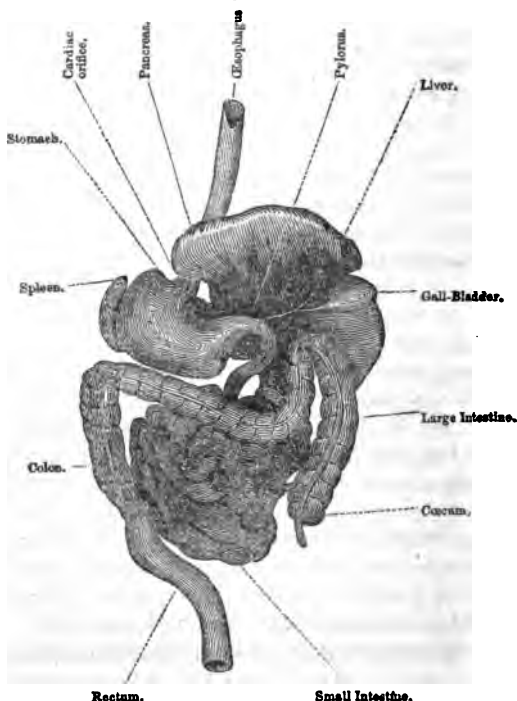
food. The secretion from these glands in man is very copious; which indicates his much nearer alliance to herbivorous than to carnivorous animals.

ALIMENTARY CANAL.

65. The length, divisions, structure, and capacity of the alimentary canal, assist us still further in determining the dietetic character of man. In carnivorous animals—whether among the Mammalia, birds, reptiles, fishes, or insects—it is generally short, its structure simple, and its capacity small; whereas, in herbivorous animals, the canal is considerably longer in proportion to the size of the animal; and the stomach, colon, and cœcum are much more complicated.^o

[NOTE 9. In Figure 30 is seen a representation of the alimentary canal, with all of the chylopoietic viscera. T.]

Fig. 30.



DIGESTIVE APPARATUS.

66. The length of the intestinal canal, as compared with the length of the body, is, in carnivorous animals, as three, five, or, in some few cases, eight to one. Herbivorous animals vary considerably in this respect; in the Pachydermata, as the horse, ass, &c., the proportion is six, eight, or eleven to one; in Ruminants, as the ox, deer, sheep, &c., it is eleven and even twenty-eight to one; and in the Simiæ, six or eight to one. In man, the proportion has usually been considered about six or seven to one; but, as the legs and thighs were improperly included in estimating the proportion in his case, and excluded in that of other animals, the result is incorrect; and we may regard ten or twelve to one as a nearer approximation to the truth. In the hog the proportion is thirteen to one. Length alone, however, is an imperfect criterion; and, unless the diameter and complication of each division of the canal be taken into consideration, our inferences respecting the natural food of an animal may be incorrect. The hyena, for instance, which lives on the flesh and bones of other animals, has an alimentary canal about eight times the length of its body; while the porpoise and dolphin, which feed on fish, have a canal extremely long, but simple in its structure.

STOMACH.

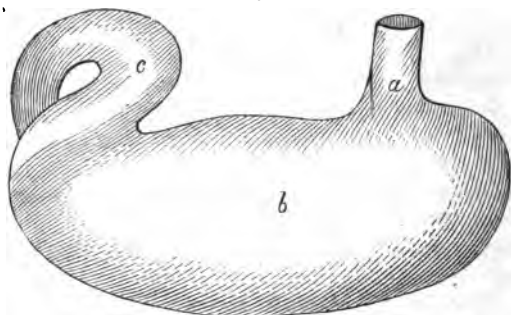
67. The stomach of the Mammalia varies very much in form and complexity; but even this important organ is not sufficient of itself to indicate the true dietetic character of an animal, without reference also to the cœcum, colon, and length of the whole canal. The stomach of carnivorous animals generally consists of a simple, globular sac, without internal division; and the same form is found in many insectivorous animals. Their food being highly concentrated, and differing little from the nature of their own tissues, requires but a slight change to prepare it for assimilation; and its liability to become putrescent requires for it a quick passage through the canal. In the Herbivora, subsisting on far less concentrated food, the stomach is divided into two or more compartments; and in the Ruminants it is very large and complicated, consisting of various cavities. Some animals of this class, as well as others that are frugivorous, have a stomach comparatively simple, differing little from that of a carnivorous animal; as is the case with the horse: in all such instances, however, the cœcum and colon are much more developed, and, by their increased dimensions, compensate for the more limited functions of the stomach.

68. In man this organ is simple, but divided into a cardiac and pyloric portion; thus occupying, as in many other anatomical respects, a middle line between the carnivorous and herbivorous Mammalia. The inner sur-

face of the stomach is covered with rugæ, or wrinkles; formed by the mucous membrane, which lines the whole of the intestinal canal, and which forms valvular folds, called "*valvulæ conniventes*," in the lower half of the duodenum, through the whole length of the jejunum, and upper part of the ileum; by which means the extent and surface of the whole canal are materially increased.¹⁰

[NOTE 10. The relative as well as the absolute form of the stomachs of carnivorous, herbivorous, and frugivorous animals, is seen in the cuts, (Figs.

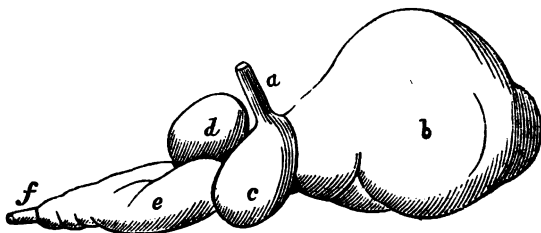
FIG. 31.



LION'S STOMACH.

31, 32, 33.) Some may imagine, at the first glance, a closer resemblance between the human stomach and the lion's, than between the human and

FIG. 32.

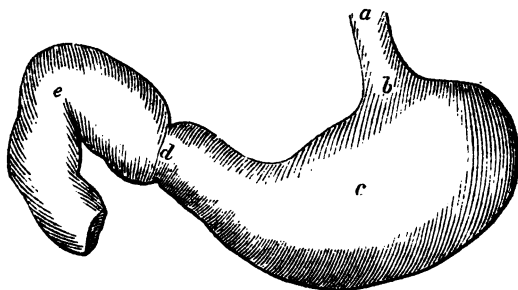


SHEEP'S STOMACH.

the sheep's. But when they are viewed in relation to their proper food, their closer resemblance will vanish at once. It should be particularly observed that, so far as mere bulk is concerned, there is a greater similarity between the food of frugivorous and carnivorous animals, than between

frugivorous and herbivorous. The digestion and assimilation of coarse herbage, as grass, leaves, &c., requires a more complicated digestive appa-

FIG. 88



HUMAN STOMACH.

ratus than grains, roots, &c., and these more so than flesh and blood. The structure of the stomach, therefore, in such case seems precisely adapted to the food we assume that Nature intended for it. T.]

COLON AND CÆCUM.

69. The colon, which is the first of the large intestines, differs little in the Carnivora from the smaller ones—the interior surface being smooth, and the capacity small and never cellulated: but in the Herbivora and in man its dimensions are much greater; and deep cells are formed in it by ligamentous bands.

70. The cæcum, or caput cæcum coli, is the blind pouch, or cul-de-sac, formed by a prolongation of the colon beyond the point at which the ileum enters its cavity. In the Carnivora the cæcum is either altogether absent, or, when present, extremely small; while in herbivorous and frugivorous animals it appears to perform, in some measure, the functions of the stomach, and is generally developed in the inverse ratio of that organ; being voluminous and complex where the stomach is simple, and proportionally small where the latter organ is complicated. In accordance with these remarks, we find no cæcum in the sloth, the stomach of which is complex; it is long, smooth, and ample, with a blunt apex, in Ruminants; and generally large, sacculated, and distinctly glandular, in the Pachydermata. Those of the Rodentia which feed upon grain, as the campagnoles, the hamsters, and the lemmings, have the cæcum large; in those that are omnivorous, as the black rat, it is small; while in those which feed upon

succulent vegetables (as the hare) it is exceedingly large ; having ten times the dimensions of the stomach.

71. In man the cœcum is tolerably large and globular, with a long "vermiform appendix," which may be regarded as the rudiment of an extended cœcum ; it is found only in the human species, in the chimpanzee, the orang, the gibbons, (in the last very short,) and in the wombat. The cœcum is proportionately much larger in infants than in adults ; change of diet probably causing it to shrink in manhood.

72. In answer to the general statement, that the cœcum is larger in the Herbivora than in the Carnivora, Dr. Tyson states, that the hedgehog, which he considers frugivorous, has neither colon nor cœcum ; but it is well ascertained that this animal naturally feeds on serpents and insects. He also alleges that the opossum, being carnivorous, has both a colon and a cœcum : to this, however, it may be replied, that the opossum lives chiefly on roots and wild fruits, though it also devours poultry.

LIVER.

73. In the Carnivora and Rodentia, which present the most complex form of liver among the Mammalia, there are five distinct parts : a central or principal lobe, corresponding with the principal part of the liver of man ; a right lateral lobe, with a lobular appendage, corresponding to the "lobulus Spigelii" and the "lobulus caudatus," and a small lobe or lobule on the left side. Through the whole animal series, however, the magnitude of the liver varies in the inverse ratio of the lungs.

74. In man, the liver is much less developed than the same organ in many other Mammalia ; and presents, as rudimentary indications, certain organs which are in other animals fully developed. Europeans, and the inhabitants of northern climates, who partake more of animal food, have the liver much larger, and its secretions more copious, than the inhabitants of warm climates. Perhaps this, in some measure, depends upon the amount of non-azotized articles taken along with the flesh of animals, by which means the system is supplied with more carbon than is needed. (See § 202.) So that the enlarged liver is attributable to gross living on a mixed diet, rather than to an exclusively animal diet.

75. There is another part of structure in which man differs from carnivorous animals, and resembles the Herbivora ; namely, the immense number of perspiratory glands in the skin ; by which the superfluous heat, generated by an excess of non-azotized food, escapes ; the retention of which in the system might be injurious. It is not improbable that hydro-

phobia owes its origin to the inactivity of this function of the skin : perspiration, in the dog, being given off principally by the tongue.

GENERAL REVIEW OF THE ORGANS.

76. The principal points of relation and difference, then, may be summed up in the following manner : In the absence of claws, and other offensive weapons ; in the form of the incisor, cuspid, and molar teeth ; in the articulation of the lower jaw ; in the form of the zygomatic arch ; in the size of the temporal and masseter muscles, and salivary glands ; in the length of the alimentary canal ; in the size and internal structure of the colon and cæcum ; in the size of the liver ; and in the number of perspiratory glands : in all these respects, man closely resembles the herbivorous class of animals. The only points in which he appears to differ from them, and approach the Carnivora, are, in the enamel of the molar teeth being confined to the external surface, instead of being arranged in upright plates, alternating with plates of ivory and of cortical substance : and in the stomach, which, though not so simple as that of the Carnivora, is much less complicated than that organ generally is in the Herbivora. Some of the latter, however, which are apparently formed for digesting grain and other concentrated food, have the stomach more simple, and the alimentary canal short, as the horse.

77. "The prevalent notion," says Dr. Combe, "that the digestive apparatus is simpler and shorter in carnivorous than in herbivorous animals, merely because their food is more analogous in composition to their own bodies, and therefore requires less perfect digestion, seems to be unfounded ; and to be negatived by the fact that, in the grain-eating birds—in the constituent elements of whose food there is no such analogy—the intestines, nevertheless, scarcely exceed in length those of the carnivorous birds ; a circumstance at variance with the notion of length being necessary, *solely* on account of the great elaboration required for the conversion of vegetable into animal substance. The true principle—and it is important to notice it, as the error is generally adopted—appears to be, that where the food of the animal contains much nutriment in a small bulk, there the stomach and intestinal canal are simple and short ; but where, on the contrary, it contains little nutriment in a large bulk, there great capacity, complexity, and length, become requisite to enable the animal to elaborate a sufficiency of nourishment for its subsistence, by taking in the requisite quantity from which it is to be derived."

78. All the human organs connected with alimentation, therefore, are evidently very different from these in carnivorous animals ; and although,

In some respects, they differ also from the organs of herbivorous animals, they are evidently much more closely allied to those of the latter class than to those of the former

CHAPTER II.

MAN (STRICTLY SPEAKING) NOT OMNIVOROUS.

79. SUPPOSING, then, we had no further evidence respecting the natural food of man than we derive from the comparison just instituted, what would be the correct inference to be deduced from it? There appears to be only one alternative; either it is intended that man should derive his subsistence from a mixture of both kinds of diet, and thus be omnivorous, (as many physiologists consider him;) or that he should feed upon substances of a nature and consistency intermediate between flesh and herbs; such as fruit, roots, and grain.

80. Let us take a careful and impartial view of this question. The indications of structure are, that flesh requires a tearing rather than a masticating process, little or no saliva, a gastric juice of a peculiar character, together with a short and simple alimentary canal, in order that the processes of assimilation may be expedited; for if animal food be detained too long in the alimentary passages, it is said to become putrid and injurious. On the contrary, vegetable food requires to be well masticated and intimately mixed with the saliva, a peculiar gastric juice for its solution, and a cellulated colon and large cæcum, for the more complete digestion of such portions of vegetable matter as have escaped the action of the stomach and duodenum. Now, if carnivorous animals have received the very best structure for the perfect assimilation of flesh, and if herbivorous animals possess the best development for the complete and healthy solution of grass and other vegetables, then man, being different from both in the structure and disposition of the alimentary organs, cannot have received the best adaptation for either kind of food; and, therefore, though a mixture of both may be tolerably digested, yet neither kind can so easily and completely undergo transformation as would be effected by the organs and secretions of animals especially adapted to its solution.

81. Physiologists inform us, that the gastric juice varies in its character

according to the food habitually taken. If flesh be eaten, the gastric juice secreted is specially adapted to its solution; if vegetables be taken, the juice changes its qualities accordingly; and if juice of an intermediate quality be formed, in consequence of a mixture of both kinds of food, it seems to be a physical impossibility that it should produce so complete an effect upon either as that kind which is specially designed for each. It may also be remarked that, with people living upon a mixed diet, in proportion as animal food predominates, the power of the stomach to digest vegetable food generally diminishes. Hence the frequent complaints of vegetables and fruits disagreeing with the stomach; so that many find it necessary to be extremely careful of what vegetables they partake; and are perhaps obliged to limit themselves to stale bread, or biscuit, or some other simple farinaceous substance. Yet even these individuals, by gradually diminishing the amount of animal food, and adopting a correct regimen, may once more return to their youthful enjoyment of fruits and vegetable substances generally.¹¹

[NOTE 11.—It is not uncommon in this city for persons, especially invalids, to assert that they have tried the vegetable diet for one, three, six, or twelve months, and found it decidedly to disagree with them. Hence, they have come to the conclusion—and so far as their experience goes, the conclusion is legitimate—that, however advantageous it might have been to some constitutions, it did not agree with theirs. I have taken some pains to investigate the circumstances of many of these failures, and have invariably found that the whole cause of the difficulty was a morbid appetite which the experimenter would not or did not control, or an injudicious quality and preparation of vegetable foods. I have never known a failure, either with well persons or invalids, where the vegetable diet was regulated by correct physiological principles. T.]

82. Let us, for a moment, direct our attention to those organs wherein man differs from the classes of animals we have considered. The hands, and the erect position of man, seem more adapted to gather the produce of fruit trees, than either to capture objects of prey, or collect herbs; and the incisor teeth, which are comparatively of little use to the Carnivora, are in man admirably suited to the office of cutting substances into convenient portions for the grinding process of the molars, and for removing the skin or rind of fruit, &c.; while the short cuspids, or canine teeth, may be rendered similarly useful.

83. The ostensible reason for regarding man as omnivorous is, that he *can* subsist upon a great variety of animal and vegetable productions, just

as climate or circumstances may determine ; but, if properly considered, this only evinces the wide range of adaptability which his organization has received ; in considering which, we are apt to overlook its special adaptation. We know that man *can* live on flesh alone, but this does not prove that he is carnivorous ; he can also live exclusively on fruit and other vegetables, but we ought not to conclude from this that he is frugivorous ; and it is equally illogical to infer that he is omnivorous because he *can* feed, with comparative health and pleasure, on a mixture of both animal and vegetable substances. The question we have to determine is, whether the development of the physical, mental, and moral powers of man, is equally complete upon whatever kind of food he lives ; or whether there is a definite kind of food upon which all the interests of his economy are better maintained than upon any other. If the former be the case, then is man truly omnivorous ; if the latter, he is not omnivorous. We have seen how far comparative anatomy supports the latter opinion, and we shall find it corroborated by the evidence from every other source.

84. From these and other considerations it appears questionable, whether any animal is strictly omnivorous ; that is, formed for feeding indiscriminately, or without preference, upon either animal or vegetable substances ; and with organs adapted for procuring, masticating, and digesting each kind of food with equal facility, so as to attain the highest degree of perfection of which its nature is susceptible. The animals which approach the nearest to this character are the hog, the bear, and the opossum ; yet these, when in a perfectly natural state, and when food is abundant, invariably prefer fruits, roots, grain, and other vegetable produce.

85. The digestive organs of the hog are very similar to those of man ; but the teeth are widely different, excepting the true molars, which very much resemble those in the human jaw, and are characteristic of animals intended to feed on vegetable matter. The cuspids and bicuspid in the hog are very similar to those of carnivorous animals ; the incisors, also, bear no resemblance to those of man. This comparison, then, by no means favors the notion that man is partly carnivorous, supposing we admit the hog to be so ; for all the characteristics connecting the latter with the Herbivora are similar to those of man ; while those which unite it with the Carnivora bear no resemblance to those of the human subject. Remembering, therefore, that the hog, when left to its own instincts, in a perfectly pure state of nature, and when food is abundant, always prefers fruits, roots, and other vegetables, and requires no animal food for its perfect development, we must inevitably conclude that man is still more widely removed from animals of a carnivorous character. But we have yet found

no true type of the human alimentary organs ; nor shall we, in any race of animals, find the characters identical in all respects.

THE QUADRUMANA.

86. The nearest approximation is met with in the Quadrumana, particularly in the orang-outang ; which, both in outward conformation and general organization, bears the greatest resemblance to man. "The masticatory organs of the orang are so closely similar," observes Professor Lawrence,* "that they might easily be mistaken for human ;" the only difference being, that the cuspids or canine teeth are relatively longer and more pointed, with intervals for the reception of those of the opposite jaw ; and the elevations on the grinding surfaces of the molars more prominent and pointed ; by which characteristics the orang approaches nearer to the Carnivora than man. The disposition of the enamel in the molar teeth is the same as in the human subject. The articulation of the lower jaw, the form of the stomach, the comparative length of the intestines, the relative capacity of the cœcum, and the cellular arrangement of the colon, in the orang-outang, likewise correspond very closely with those of the human body ; and in what part soever a difference is detected, it denotes man to be less formed for animal diet than the orang. The zygoma (for instance) is larger, and the temporal muscles are far more powerful than in man ; the muciparous, labial and buccal glands, (which soften the contents of the cheek-pouches,) are more constant and larger in man than in the Simiæ ; but the parotid, submaxillary, and sublingual glands are less ; the valvular folds of the stomach, duodenum, &c., are wanting in the orang. In other species of the Simiæ, the teeth are of a more carnivorous character. Comparative anatomy, therefore, warrants us in concluding that the alimentary organs of the orang are the true type with which to compare those of man, in order to ascertain his true dietetic character. Now, as the orang-outang and most species of monkeys, when in a pure state of nature, and when left free to choose their own food, and to follow their undepraved instincts, are wholly frugivorous, subsisting exclusively on fruits, nuts, and other esculent farinaceous vegetables, we are perfectly justified by all the laws of correct reasoning in concluding, that the natural food of man is not of that mixed nature which many physiologists would have us to believe.

87. Dr. Abel's orang "appears naturally to have preferred fruit ; though he yielded, on shipboard, to the temptation of meat, and seems to have quickly become as carnivorous as his companions. His food in Java was chiefly fruit, especially mangostans, of which he was excessively fond ;

he also sucked eggs with voracity, and often employed himself in seeking them. On shipboard he was very fond of bread, and would not refuse flesh; but always preferred fruits when he could obtain them. Afterwards, however, his food was vegetable; both from his own choice, and because it agreed much the best with him."* Sir William Jardine says: "The food of this family may be called almost entirely vegetable; the eggs and occasionally the young of birds being the only approach which can be traced to a carnivorous propensity."† They plunder the maize-fields, and rob the orchards of their choicest fruits; and, in a state of confinement, vegetable diet continues their favorite and most nourishing support; but they will eat almost any thing that the luxury of man has introduced, and some even become remarkable for their peculiarities. One of the keepers of the Tower of London informed Mr. Newton, "that experience has taught those who have the care of the menagerie, that feeding monkeys on flesh renders them gross, and shortens their lives; from which practice they have therefore desisted."

88. Of the hoolocks, another species of orang, and native of the Garrow Hills in British India, it is said, "their food, in the wild state, consists (for the most part) of fruits common only to the jungle in this district of country; and they are particularly fond of the seeds and fruits of that sacred tree of India called the peopul tree." Of one of these it is also stated that, "like many of the religious castes of this country, he seemed to entertain an antipathy to an indiscriminate use of animal food; and would not eat of either the flesh of the cow or hog; would sometimes taste a little piece of beef, but never eat of it." He would take fried fish, which he seemed to relish better than almost any other description of animal food, with the exception of chicken; and even this he would eat but very sparingly of; preferring his common diet, bread and milk, with sugar, fruit, &c.‡ Of some species of South American Simiæ it is incidentally mentioned by Humboldt, that they live on fruits; and indeed all travellers and naturalists agree in representing the Quadrumana as naturally frugivorous. All evidence derivable from comparative anatomy, therefore, is as demonstrative as we can expect such evidence to be, that the natural dietetic character of man is also frugivorous.

OPINIONS OF LINNÆUS, CUVIER, AND OTHERS.

89. This part of the subject might now be safely left to the unbiassed

* Jardine's Naturalist's Library. Mammalia, vol. i., p. 76.

† Ibid. p. 81.

‡ Sir W. Jardine's Natural History of Monkeys, p. 98-100.

judgment of all who would seriously reflect upon the evidence produced ; but—lest the facts I have advanced should appear to some not sufficiently supported, and, consequently, the inferences not fairly drawn—I shall here add the testimony of men whose scientific acquirements and mental qualifications are universally acknowledged. Not that truth of an abstract and demonstrative nature is rendered any more a truth by the weight of any human authority, or by the sanction of a great name ; but because some may be inclined to pay more attention to a much-neglected inquiry, when they know that men of great talents have examined it, and have arrived at a conclusion at variance with the opinion of the generality of mankind. “Such are the scientific attainments and the general knowledge and integrity of some men,” observes Sylvester Graham, “that their opinion on subjects to which they have given great attention is worthy of high consideration ; and when such men are compelled, by the force of irresistible evidence, to come to conclusions and acknowledge principles which do not accord with their preferences, nor correspond with their practices, the testimony merits respect.”*

90. Linnæus, one of the most celebrated naturalists that ever existed, speaking of fruit, says : “This species of food is that which is most suitable to man : which is evinced by the series of quadrupeds ; analogy ; wild men ; apes ; the structure of the mouth, of the stomach, and the hands.”†

91. M. Daubenton, the associate of Buffon, and the first writer who rendered the study of anatomy subservient to natural history, observes : “It is, then, highly probable that man in a state of pure nature, living in a confined society, and in a genial climate, where the earth required but little culture to produce its fruits, did subsist upon these, without seeking to prey on animals.”‡

92. Gassendi, in his celebrated letter to Van Helmont, says : “I was therefore contending, that we do not appear to be adapted by nature to the use of flesh-diet, from the conformation of the teeth ; since all animals (I speak of terrestrial ones) which nature has formed to feed on flesh, have teeth long, conical, sharp, uneven, and with intervals between them ; of which kind are lions, tigers, wolves, dogs, cats, &c. But those which are created to subsist only on herbs and fruits, have their teeth short, broad, blunt, adjoining to one another, and distributed in even rows ; of which sort are horses, horned cattle, sheep, goats, deer, and some others. And, further, that men have received from nature teeth which are unlike those

* Lectures on the Science of Human Life, vol. ii., p. 71.

† Linnæi *Amoenitates Academicæ*, vol. x., p. 8.

‡ Daubenton's *Observations on Indigestion*. Translated by Dr. A. P. Buchan.

of the first class, and resemble those of the second ; it is therefore probable, since men are land-animals, that nature intended them to follow, in the selection of their food, not the carnivorous tribes, but those races of animals which are contented with the simple productions of the earth. Wherefore, I repeat, that from the primeval and spotless institution of our nature, the teeth were destined to the mastication, not of flesh, but of fruits." "As to what relates to flesh, it is indeed true that man may be sustained on meat ; but how many things does man do which are contrary to his nature ! Such is the perversion of manners now, by a general contagion, enamelled into him, that he seems to have become a new creature. Hence the doctrines of morality and philosophy are directed to no other object, than to recall mankind to the paths of nature, which they have abandoned."*

93. Sir Everard Home says : "While mankind remained in a state of innocence, there is every ground to believe that their only food was the produce of the vegetable kingdom."

94. Baron Cuvier, whose knowledge of comparative anatomy was most profound, and whose authority therefore is entitled to the greatest respect, thus writes : "Fruits, roots, and the succulent parts of vegetables, appear to be the natural food of man : his hands afford him a facility in gathering them ; and his short and comparatively weak jaws, his short canine teeth not passing beyond the common line of the others, and the tuberculous teeth, would not permit him either to feed on herbage or devour flesh, unless those aliments were previously prepared by the culinary processes."

95. "The use of plants," says Ray, the celebrated botanist, "is all our life long of that universal importance and concern, that we can neither live nor subsist with any decency and convenience, or be said to live indeed at all, without them. Whatsoever food is necessary to sustain us, whatsoever contributes to delight and refresh us, is supplied and brought forth out of that plentiful and abundant store. And, ah ! how much more innocent, sweet, and healthful, is a table covered with these, than with all the reeking flesh of slaughtered and butchered animals ! Certainly man by nature was never made to be a carnivorous animal, nor is he armed at all for prey or rapine, with jagged and pointed teeth, and crooked claws sharpened to rend and tear ; but with gentle hands to gather fruits and vegetables, and with teeth to chew and eat them."†

96. Professor Lawrence observes : "Physiologists have usually repre-

* Gassendi's Works, vol. x., p. 20.

† Evelyn's *Acetaria*, p. 170.

sented, that our species holds a middle rank in the masticatory and digestive apparatus, between carnivorous and herbivorous animals; a statement which seems rather to have been deduced from what we have learned by experience on this subject, than to have resulted fairly from an actual comparison of man and animals." After comparing the alimentary organs of man with those of other animals, he further says: "The teeth of man have not the slightest resemblance to those of the carnivorous animals, except that their enamel is confined to the external surface. He possesses, indeed, teeth called 'canine;' but they do not exceed the level of the others, and are obviously unsuited to the purposes which the corresponding teeth execute in carnivorous animals." After sundry observations on organization, he says: "Thus we find that, whether we consider the teeth and jaws, or the immediate instruments of digestion, the human structure closely resembles that of the *Simiæ*; all of which, in their natural state, are completely herbivorous."† (frugivorous?)

97. Lord Monboddo says: "Though I think that man has, from nature, the capacity of living either by prey or upon the fruits of the earth, it appears to me that, by nature, and in his original state, he is a frugivorous animal; and that he only becomes an animal of prey by acquired habit."

98. "The *Quadrumana* or monkey tribes," observes Roget, "approach nearest to the human structure in the conformation of their teeth, which appear formed for a mixed kind of food, but are especially adapted to the consumption of the more esculent fruits."

99. Broussonet, an eminent French naturalist, also inferred from the teeth, that in the origin of society, man's diet must have been exclusively vegetable.

100. Mr. Thomas Bell, in his "Anatomy, Physiology, and Diseases of the Teeth," observes: "The opinion which I venture to give has not been hastily formed, nor without what appeared to me sufficient grounds. It is, I think, not going too far to say, that every fact connected with the human organization goes to prove, that man was originally formed a frugivorous animal; and therefore tropical, or nearly so, with regard to his geographical position. This opinion is principally derived from the formation of his teeth and digestive organs; as well as from the character of his skin, and the general structure of his limbs." The opinions of various other celebrated writers might be quoted: but they are reserved for another part of this work.

101. Seeing, then, that comparative anatomy is so clear in its indications of the proper food of man, and that men so well qualified for giving

† Lectures on Physiology, &c., pp. 183, 189, 191.

an opinion upon the matter have expressed themselves so decidedly, it certainly is surprising to find so many authors on physiology and dietetics ridiculing the idea of a vegetable diet; and briefly stating, without an attempt at proof, that the teeth, stomach, and other parts of man's structure, declare him to be omnivorous, or formed for a mixed diet. The misconception, (such I must consider it,) seems to have arisen from confounding a fruit and farinaceous (commonly called vegetable) diet with an herbivorous one; Professor Lawrence, even, having misapplied the latter term. It would be absurd to contend that man was formed for deriving his subsistence from the latter kind of food; though the more esculent vegetables may occasionally be enjoyed with impunity, or positive benefit; but it does not appear to me possible to derive, from comparative anatomy, a single argument calculated to negative the conclusion, that the human organization is specially adapted to fruit, roots, grain, and other farinaceous vegetables.¹²

[NOTE 12. The easy manner in which our medico-physiological writers dispose of this subject, may be seen in the following extracts from Dunglison and Carpenter, the latest and most popular American and English authors, both of whom seem to mistake assertions for arguments, and statistics for principles.

Says Dunglison: "In his arrangement of the digestive organs, man intermediate between the carnivorous and the herbivorous animal."

Dr. Carpenter remarks: "The construction of his digestive apparatus, as well as his own instinctive propensities, point to a mixed diet as that which is best suited to his wants." T.]

OBJECTIONS ANSWERED.

102. Two objections to an exclusively vegetable diet may be here considered:

1. It has been objected, that although the orang-outang, so nearly resembling man in his organization, is, in a perfect state of nature, strictly frugivorous, yet he readily learns to eat and enjoy the flesh of animals; and that experience has taught us, that man also can live upon animal food with impunity.

2. That though man is organized as a frugivorous animal, and doubtless fed upon fruit when first created, and in a purely natural state, yet his reasoning powers, and the possession of fire, enable him so to modify and change the flesh of animals as to render it not only pleasant to his senses, but also highly nutritious and healthful.

103. In reply to the first objection, I freely grant that both the Quadra-

mana and man are able to substitute, with apparent impunity, an animal for a vegetable diet: but what does this prove? Merely that, although constitutionally adapted to a frugivorous diet, there is in their alimentary organs a certain range of adaptability, by which they are enabled to deviate considerably from their nature, without any immediately apparent bad effects. This is a wise and kind provision in the organization of all animals; by which they are enabled, in peculiar circumstances, and in cases of necessity, to subsist on food to which their organs were not originally adapted; and to which, on ordinary occasions, with a full supply of their natural food, they would not resort. A lamb, for instance, during a long sea-voyage, was induced to live upon the flesh of animals; and so powerful was the force of habit, that it finally refused to crop the grass destined by nature for its support. Horses, on the coast of Arabia, are constantly fed upon fish, herbage being deficient; and they seem very much to relish this, to them, unnatural diet. The Gauls fed their oxen and horses with fish; so did the Pæonians, mentioned by Herodotus. "In Norway, as well as in some parts of Hadramant and the Coromandel coasts, the cattle are fed upon the refuse of fish."* (441.) Even a young wood-pigeon, which is principally granivorous, has been brought to relish flesh, so as to refuse every other kind of food, even grain, of which it is naturally so fond. Parrots, which are exclusively frugivorous, are taught by habit to relish animal food.

104. Thus are various herbivorous and granivorous animals reduced, by circumstances, to live upon animal food; and it is equally true that carnivorous animals (as the lion, tiger, cat, &c.) have been taught to live, and to thrive moderately upon vegetable diet. "If the young of these animals, before they have tasted flesh, be carefully trained to a vegetable diet till they are grown up, they will manifest no desire for flesh-meat."† Young kittens have been fed upon vegetable diet, without appearing to have suffered from it in health and strength, and, when fully grown, would refuse to eat flesh, which, if forced upon them, would at first render them sick. They would kill rats and mice, but would not devour them.

105. Many similar changes in the food of animals have been effected by art and circumstances; but the widest range of variation, as regards food, exists, as might be expected, in those animals, the alimentary organs of which are intermediate between the carnivorous and herbivorous classes; namely, such as feed upon fruit and farinaceous substances. This is more especially the case with man; and by it he is capacitated for becoming the

* "Life of Reginald Heber," in Harper's "Family Library." No. 40, p. 360. (America.)

† Graham's Lectures, vol. II., p. 69.

denizen of every climate, and qualified for fulfilling the divine command, "Be fruitful, and multiply and replenish the earth, and subdue it." (Genesis i. 28.) Adapted by nature for feeding upon neither flesh nor herbage, he is (notwithstanding) created with an adaptation to either or both, as climate or circumstances may render necessary; but we are not justified in inferring, that he enjoys by this deviation from nature that full share of health, pleasure, and longevity, which would be secured by a strict adherence to his more natural diet. If, therefore, we would judge correctly of organs and their functions, we must carefully distinguish between *adaptation* and *adaptability*; and must not hastily conclude, that because an animal can exist and be comparatively well upon a certain kind of diet, it was designed to live on that diet, as its best and most natural food. Each animal has been organized upon fixed principles, and each organ has its determinate function and special adaptation; but an all-wise Creator has provided against emergencies, by conferring on each organ, particularly if connected with existence or with organic life, a considerable latitude; by which it can, to a certain extent, vary its functions without destroying its power, or so far impairing the constitution as suddenly to destroy life. We are no more justified, therefore, in concluding frugivorous animals, as the orang-outang and man, omnivorous, than we are in declaring the lion, the tiger, and the cat, or the horse, the cow, and the sheep, omnivorous, because they can be trained to feed upon either animal flesh or vegetables, or a mixture of both.

106. Professor Lawrence and other physiologists, who fully admit that man is constitutionally adapted to a vegetable diet; that he can be perfectly nourished by it, and enjoy as much health and vigor as upon a mixed diet, yet urge the second objection, (102,) and contend that the ingenuity of man, by the assistance of fire and certain culinary operations, can so modify and change the flesh of animals as to render it more appropriate for his diet than that for which nature has specially adapted him.

107. There is something so very absurd and contradictory in this supposition, that it scarcely requires any argument to refute it. A little girl who attended a Sunday-school was once chided for having her hair curled; and was told that if God had intended it to be curled, nature would have done it without her assistance. Her reply was, that when very young, and not able to take care of herself, her hair curled of its own accord; but, being now grown up, she thought God expected her to attend to it herself; a much more rational argument, in my opinion, than is employed by those who consider the discoveries of man superior to the teachings of nature.

"To gild refined gold, to paint the Lily,
To throw a perfume on the violet,
To smooth the ice, or add another hue
Unto the rainbow, or with taper light
To seek the beauteous eye of heaven to garnish,
Is wasteful and ridiculous excess."^{*}

108. Nature existed before art ; and it was shown, when speaking of the original diet of man, (42, 43,) that he would require food before either fire or any implement for dressing food was known : is it not consistent, therefore, with the wisdom and design we see manifested in all creation, animate and inanimate, to suppose, that the most natural and best food of man is that which his organs are evidently adapted to assimilate without any artificial preparation ?

109. To man, no doubt, has been granted superiority of intellect ; but it appears to me that the legitimate use of it, with respect to food, is not to supplant pure animal instinct, but to accord with and assist it ; not to discover a substitute for what nature has evidently intended for our support ; but rather to bring our natural diet to that high state of perfection of which we know, in the most favorable circumstances, it is capable ; to till the earth, and render it fruitful, in obedience to the original command ; to supply, by artificial heat and moisture, the defects of uncongenial climes ; and to discover the means, not only of creating an abundance of all things which a natural and undepraved appetite would direct us to enjoy ; but also of preserving them, and their nutritious qualities, through all seasons of the year.

110. The proper employment of the superior mental qualifications of man, is to discover the intimate relations that exist between animate and inanimate nature ; not to change or confound them : to investigate and obey the physiological laws and functions of animal life ; not to subvert them, or render man independent of their influence. " Reason and instinct," observes Dr. Lambe, " are but different modes of attaining the same end ; nor can the former be more wisely employed than in rendering our habits conformable to the dictates of the latter."

111. If, then, we have proved that there is a direct relation between the alimentary organs of man and vegetable diet, and none between those organs and the flesh of animals, it is evident that the highest development of his corporeal and mental powers will be effected by employing those powers in pursuance of those relations ; for no artificial preparation of

^{*} Shakspeare's King John, Act iv., Scene 2.

animal flesh can render it a fit substitute for what nature has appointed. It must be remembered, that the question is not—"What substances can man, by artificial preparation, succeed in rendering digestible and nutritious?"—for we have seen that all animals have considerable latitude granted them in this respect, even without preparation: but the real inquiry is—"What substances appear best adapted by nature for the nutrition of man, and for most effectually promoting all the vital interests of his system?" This question has already been answered; and the objection we have been considering depends upon mere assertion: but it will receive further illustration as we proceed.

CHAPTER III.

PHYSIOLOGY OF SIGHT, SMELL, AND TASTE.

112. HAVING consulted Comparative Anatomy respecting the dietetic character of man, let us next proceed to inquire what light is thrown upon the subject by Physiology; and let us, in the first place, consider the senses of sight, smell, and taste.

113. It has been previously observed, (36,) that in all matters connected with organic life, comprehending the preservation of existence and the propagation of the species, man is directed by similar instinctive feelings, and governed by the same general laws, as inferior animals. These instincts, in a great measure, depend on those organs of sense which are placed in direct relation to the organs of digestion, and to the substances best adapted for supporting the normal and healthy condition of each particular structure; and a certain degree of pleasure, while this healthy condition remains, invariably accompanies the gratification of those appetites which are the result of special organization. Hence the carnivorous animal feasts with savage delight on the mangled limbs of his victim; and the senses of sight, smell, and taste, participate in the pleasures of the repast. No sooner is the sensation of hunger excited by the wants of his system, than he is roused to action, and seeks to appease the cravings of his appetite. He passes by the herbs of the field, the farinaceous roots and pendent fruits, as objects of indifference; they have no attraction for him, having no relation to his organs of sense; nor are his digestive

organs well constituted for abstracting from them the nutriment they contain. He therefore either lies in wait, or pursues his onward course till the sense of sight or smell informs him that his prey is near; and then speed, force, and stratagem, are employed to entrap it. The sight of his victim stimulates his efforts; the odor, which is in relation with his olfactory nerves, whets his appetite, and urges him on in the pursuit; until, at length, having hunted down and lacerated the object of his desires, the blood adds new zest to his pleasure, and his appetite is sated with the quivering and gory limbs of his helpless victim.

114. It is far otherwise with the herbivorous animal, when stimulated by hunger to satiate its appetite. The blood of its fellows has no charms for it, nor can it derive pleasure from devouring their flesh; on the contrary, it is attracted by the verdant meads, where its sight, smell, and taste find ample gratification. Those plants which are best adapted to its nature are selected with unerring precision; and it crops with delight the nutritious herbs, which, being assimilated by its compound stomach and convoluted intestines, supply the daily waste of structure, and renew the animal heat. Other animals are directed, by their instincts, to devour with avidity decaying animal and vegetable matter; and objects which appear to all our organs of sense most revolting, are to them a delicious feast. The excrements and putrid flesh of animals, and the various accumulations of disorganized matter, are peopled with myriads of little animals, having organs of sense and digestion in accordance with the situation they are destined to hold; and, no doubt, their happiness is as complete, and their enjoyment as great, as is consistent with their nature.

115. Sight, smell, and taste, appear to be the senses by which man and all animals are directed in their choice of food; and although the organs which are the seat of these senses occupy similar situations, and seem similarly constructed, in all the Mammalia at least, yet how extensively varied must the minute anatomy of these organs be; since the same object will produce widely different and sometimes opposite sensations in one animal, to those which it produces in another! The organization may be relatively perfect in each; and yet, owing to the difference of relation subsisting between the object and the variously-developed organs, a totally different result be produced. The eyes of each animal, for instance, may be so adapted to the rays of light, that all objects (whether of an animal, vegetable, or mineral nature) may convey correct ideas of their color and figure; the odor from various substances may rightly affect the olfactory nerves, and the sapid properties of bodies may duly influence the papillæ of the tongue, &c., and yet the kind and degree of the resulting sensation

may be infinitely diversified ; so that what is agreeable to one, may be indifferent or even disagreeable to another. The distance at which one animal is affected by an odor to which another is totally insensible, is truly astonishing, while the reverse may be the case with an odor of a different kind. A dog, for example, will scent its prey or a piece of flesh at a considerable distance ; while to fragrant flowers or fruit he seems quite insensible or indifferent. No eye, though aided by the most powerful glasses, and directed by the most skilful anatomist, is able duly to appreciate the infinitesimal divisions, or to unravel the complicated texture, so as to predicate the variation of function from the difference of structure : we must, therefore, in a great measure, be content to infer the difference of structure from the apparent diversity of sensation.

116. "Nature," says Mr. Sidney Smith, "has not formed man totally different from other animals ; but rather added to his brain new organs. She has not, in his case, pulled down the fabric of sentient being, and reconstructed it upon a totally different plan. All that she has done, has been to add to the original edifice Corinthian capitals and Doric columns ; bestowing reason, not to supersede, but to guide, direct, and perfect his animal nature. We may rest assured, therefore, that whatsoever principles, in the shape of instincts, are given to animals for their preservation and protection, are also instincts in man ; and that what in them is a propensity or desire, is not in him any thing else."

117. But man, who was created lord of all, and destined to have all other animals in subjection, vainly arrogates to himself the liberty of changing his instinctive feelings, and of selecting his food from every department of nature. He cannot take pleasure, it is true, in devouring the gory limbs of a recently-slain victim ; but, by means of fire and condiments, he gradually acquires the habit of feasting on the flesh of animals. Into the same service he presses the various kinds of vegetables ; and even acquires, at length, the power of relishing the half-putrid limbs of birds of the air and beasts of the field.

118. This power of assimilating so great a variety of aliment, has induced many physiologists to consider man strictly omnivorous ; but if we mark his peculiar instincts, as manifested through the various organs of sense, we shall, I think, find sufficient reason for concluding, that the vegetable kingdom alone affords him that food which is best adapted to his peculiar organization ; from which he would derive a greater share of enjoyment in gratifying his appetite ; and which would be more favorable to health of body, elasticity of mind, moral culture, and longevity, than any other description of diet.

SIGHT.

119. Of all things in the form of food, the mellow fruits of genial climes seem to the eye of man the most attractive and pleasing. The varied hues and colors occasion an increased flow of saliva; ideas of pleasure to be derived from the smell and taste are awakened; and a desire to possess frequently becomes a strong temptation, particularly to the young. Other objects, when artificially prepared and associated with previous enjoyment, will, I am aware, excite similar feelings; but the sight of no article of food, in a natural condition, is so calculated to rouse the appetite, when the taste has not been vitiated by acquired habits. Accordingly we find, as previously mentioned, (40,) that it was by this sense Eve was first tempted to eat of the forbidden fruit.

SMELL.

120. The sense of smell seems more especially intended as a guide for animals in the selection of their appropriate food; and in man we find this sense placed in a closer relation with fruit than with any other article of diet. Dr. Roget observes, that "the hog, which, in its natural state, subsists wholly on vegetable food, resembles herbivorous tribes in the external form and relative magnitude of the turbinated bones; but they are more simple in their structure; being formed of single and slightly convoluted plates, without partitions or perforation. In this respect they approach to the human structure, which is even less complicated, and indicates a greater affinity with vegetable than with animal feeders. Man distinguishes more accurately vegetable odors than those proceeding from animal substances. The reverse is observed with regard to quadrupeds whose habits are decidedly carnivorous."

121. The "antrum highmorianum," or maxillary sinus, which communicates laterally with that of the nose, is of moderate size in man, and is seated above the sockets of the three last molar teeth: it is also of moderate size in the ox, goat, and other Ruminants; but is nearly, if not quite obliterated in the Simiæ, and does not appear in the Carnivora.

122. "The olfactory nerves are proportionately large in predaceous animals, and are ramified over extensive nasal surfaces, thus giving them power; while in those herbivorous and other animals which simply require an olfactory sense to discriminate the qualities of substances near at hand, the olfactory nerves are proportionately small, and the olfactory apparatus is more simple in its mechanical construction; whereby power is sacrificed to discrimination. In this respect, the organization of man decidedly places him with vegetable-feeding animals. There is a nice distinction

between simple *power* and *discrimination*. The hound, for instance, possesses the former ; the sheep the latter.* “Man,” says Miller, “is far inferior to carnivorous animals in acuteness of smell ; but his sphere of susceptibility to odors is more uniform and extended.”†

123. The olfactory nerves ramify over the lining membrane of the nasal cavity, through which the air passes into the lungs ; and in a perfectly normal state, warn animals of danger, when odors injurious to the system are present ; in order that, by a temporary suspension of the breath, or change of locality, they may avoid the threatened evil.

124. Thus the sense of smell becomes a sentinel, both for the lungs and the alimentary canal ; not only administering to the necessities of animals by directing them to their proper diet, but also teaching them to shun all such effluvia as are prejudicial to health. In man, it is a source of considerable pleasure, from its relation to the fragrance of flowers and other perfumes.

125. It has been frequently asserted by physiologists, that this sense is far less acute in man than in other animals. Judging from its present depraved condition, in an artificial state of society, this is undoubtedly true. Man can neither scent at a distance the flesh and secretions of other animals, like the dog, (an endowment by no means desirable for him,) nor can he distinguish the numerous species of grass and herbage, like the sheep and ox ; because these are not adapted to his wants : but were he brought up in strict accordance with the constitutional laws of his nature, there is every reason to believe he would be able to discriminate, with the greatest delicacy of perception, all such articles of food as are beneficial from those which are detrimental. The various species of fruit, in particular, he would easily and accurately distinguish, by the minute differences of odor and perfume ; and would be able, instinctively and instantaneously, to reject such as were poisonous or hurtful.

126. “The smell,” says Saint Pierre, “may be considered as an anticipation of taste, and as a method of judging whether the food in question suits the stomach. Though we should have difficulty in explaining the process by which it leads our judgments, we may be satisfied that its instincts are more to be depended on than all the theories of physicians.”‡ Fruit being almost the only article of food which, in its natural state, is pleasant to the sense of smell in man, we may regard it as an additional proof that, when it can be obtained in variety and perfection, this is his natural diet.

* Graham's Lectures, vol. II., p. 285.

† Elements of Physiology, vol. II., p. 1817.

‡ Harmonies of Nature, vol. I., p. 186.

TASTE.

127. The organ of taste is in strict harmony with that of smell; and is formed for appreciating and selecting, by their gustatory properties, substances fitted for nourishing the body, and renewing its structure. This organ, when not vitiated by habit and improper indulgence, is a sure guide for man in the choice of his food. All such substances as are adapted to his constitutional wants, possess so direct a relation to the organ, as to yield him agreeable and even pleasurable sensations; but such as are calculated to weaken or destroy the integrity of his structure, prove distasteful and offensive. The muciparous and salivary glands are immediately excited, and pour forth their secretions to protect the parts from injury; and, if the substances be decidedly dangerous to life, nausea and vomiting are frequently the consequence. But should injurious and improper flavors be frequently repeated, the integrity of the organ will be destroyed; its efficiency as a guide will no longer exist; natural and salutary articles of diet will cease to be relished; substances most pernicious and (in the first instance) nauseous, will become agreeable to the palate; custom will become law; and the foundation of disease will gradually, but no less certainly, be laid.

128. M. Raspail, a medical writer of the present day, observes: "Man possesses, equally with animals, the instinctive knowledge of that which is suitable to him: this instinct, in him, takes the name of 'taste.' His taste, in a normal condition, is the rule of his wants: he has but to consult it; to keep himself in health, he has only to acquire a knowledge of himself. To oppose these natural tastes by medicinal prescriptions, instead of aliments, is not science, but pedantry; it is not a sign of being learned; it is only an attempt to appear so, in the presence of suffering humanity."*

129. Thus we see that the three senses which direct all animals instinctively to eat the substances best adapted to their wants and to their organs of digestion, are equally adapted to discharge the same office for man; harmonizing with all other parts of his organization, in pointing to fruit as his best and most natural diet. It is, therefore, of the utmost consequence that he should carefully preserve the integrity of these important organs; and not deteriorate their functional powers by vicious indulgence or unnatural habits; lest they cease to warn him when danger is at hand, and become no longer a sure guide in the choice of food. It seems reasonable

* Medical Times, August 26, 1848.

to conclude that the following relations between fruits and man are the results of special design. The general height at which fruits grow is adapted to his stature and upright position; their elevation and shape to his hands as organs of prehension; their consistency to his teeth; the liveliness and beauty of their colors to his organ of vision; their agreeable fragrance to his sense of smell; and their grateful and delicious flavor to his taste. Many roots, nuts, corn, rice, and esculent vegetables, seem to be equally proper for man, as articles of diet; and it may be urged, that the organ of smell fails to direct him in the choice of them. But it must not be forgotten, that the instincts of man are no longer in their original state; and the sense of smell may now have lost much of its primitive sensibility and discrimination. These articles, however, the presence of which is scarcely appreciable by the sense of smell, and the gustatory properties of which but slightly affect the taste, are yet so agreeable, and so constitutionally adapted to our wants, that their use can be daily continued for considerable periods of time, without either sickening the stomach, or becoming disagreeable to the palate. Those, on the contrary, who feed upon less natural diet, such as the artificially prepared flesh of animals, require continual change. The frequent repetition of a richly-flavored dish, how much soever it may be enjoyed at first, becomes daily less agreeable; until, at last, the sight, smell, and taste of the object can be no longer endured: while bread, potatoes, rice, &c., as solids, and water as a liquid, can, in a normal state of the system, be daily enjoyed for months and years, without becoming less agreeable to the appetite.

130. It is a law, well ascertained by physiologists, that when an organ has been perverted from its original use, through a few successive generations, a change of function is produced, which becomes, to a considerable degree, hereditary; and it may require a proper direction through as many generations, to reduce it to its original and normal state.* Yet even in children of flesh-eating parents, we find a preference for fruit, bread, and other farinaceous substances; and they would gladly forego the most savory dishes for the delicious food which nature supplies for their use, without requiring artificial preparation. What risks will not boys run, what dangers will they not brave, to obtain the food that proved so irresistible a temptation to the mother of our race! Even the theft of fruit seems to be considered by many people a venial offence, compared with the theft of any other article of equal value.

* See Appendix A.

131. By the custom of our country, however, we are gradually trained, from infancy to manhood, to an animal diet; and are led to suppose, from universal opinion, that the flesh of other animals is necessary to our existence and well-being; habit and association render it agreeable to the taste, and we learn to prefer it to any other food. But when a person has abstained from animal food for a considerable period, and has acquired a relish for a more wholesome and more natural diet, he experiences a much purer and more exquisite enjoyment; and wonders how others can take pleasure in cutting and chewing the dead bodies of animals. (420.)

132. Caspar Hauser, who, in close confinement, was fed, from childhood till seventeen years of age, on coarse bread and water, had an instinctive loathing and abhorrence of flesh, when first presented to him. His biographer says: "The odor of flesh was to him the most horrible of all smells. When the first morsel was offered to him, scarcely had it touched his lips, before he shuddered; the muscles of his face were seized with convulsive spasms; and, with visible horror, he spat it out." "Some flesh was subsequently concealed in his bread: he smelt it immediately, and expressed a great aversion to it; but was nevertheless prevailed upon to eat it: and he felt afterwards extremely ill in consequence of having done so."

133. With instincts so favorable to the adoption of a vegetable diet, therefore, it seems almost unaccountable, that man should have so generally indulged in animal food. "I am astonished to think," says Plutarch, "what appetite first induced man to taste of a dead carcass; or what motive could suggest the notion of nourishing himself with the putrefying flesh of dead animals."

OBJECTION.—FLESH-EATING GENERAL IN VARIOUS NATIONS.

134. It has been said, that the general adoption of an animal or mixed diet by mankind in various parts of the earth, is a proof that man is instinctively omnivorous. But were the habit of eating flesh-meat universal, which, as will hereafter be shown, is far from being the case, this would not demonstrate that it is the natural diet of man. Many habits might be pointed out as general, in almost all portions of the earth, which are nevertheless perfectly artificial, and opposed to the health and happiness of man.

135. "Tobacco," observes Sylvester Graham,* "is quite as extensively used by human beings as flesh-meat is; and those who are accustomed to the use of it, would a thousand times sooner relinquish their flesh-meat for ever, than abandon their tobacco. Yet no one, I presume, will contend that

* Lectures on the Science of Human Life. Vol. II. p. 88.

this proves man to have a natural instinctive desire or appetite for tobacco ; and that tobacco was made for the use to which man has appropriated it. We know that man has, naturally, a deep and utter loathing of tobacco ; and that he is obliged to overcome the most powerful antipathy of his nature, in adapting himself to the use of it ; but if every human being were trained to the use of tobacco so early in life, and by such delicate and imperceptible degrees, that he could not appreciate or remember the first effects of it upon the system, it would almost be impossible for us to believe that man has not a natural, instinctive desire and necessity for it. It is precisely so in regard to flesh-eating. All who have perfectly sanctified themselves from animal food, and restored their instinctive faculties of smell and taste to something of their native purity, well know that flesh-meat is most loathsome to them. And if any number of human children were born of vegetable-eating parents, and nursed by vegetable-eating mothers, and (at a proper age) accustomed to a purely vegetable diet, and never permitted to smell animal food when cooking, nor to see others eat it ; every one of them, if there were millions, would at first discover strong loathing, if flesh-meat were given to them for food ; and they would spit it from their mouths, with as much disgust as they would tobacco. But when children are born of flesh-eating parents, and nursed by flesh-eating mothers, and are habituated (from the hour of their birth) to the savor and the odor of animal food, in the nourishment which they derive from the mother's breast, in the respiration and perspiration of their parents and others around them, and in the fumes of the kitchen and the table, and are accustomed to be fed with animal substances in their infancy, and to see their parents and others devour flesh-meat at almost every meal, they, as a matter of necessity, become depraved in their natural instincts ; and, almost as a matter of necessity, discover an early fondness for animal food. So in the East, where every human being smokes, it is nearly a universal custom for nursing mothers, every few minutes, to take the pipe from their own mouths, and put it into the mouths of their sucking infants. The necessary consequence is, that all those children early discover the greatest fondness for the pipe, and seize and suck it with excessive eagerness, whenever it is presented to them ; and they are exceedingly discontented, and fretful, and unhappy, if it is withheld from them ; and, therefore, according to the logic of those who would prove man to be naturally omnivorous from his dietetic habits, it is natural and proper for those infants, and for all human beings, to smoke, chew, and snuff tobacco."

136. "The truth is, all animals (including man) are constituted upon certain physiological principles, out of which grow certain physiological

wants : and upon these wants are established certain faculties of instinct, with determinate relation to the nature and qualities of the appropriate supplies. These faculties, while preserved in their integrity, are a law of truth to all ; but they are capable of being depraved, and rendered totally blind guides, which lead to the most pernicious errors."

137. "The lower animals have neither the mental nor the voluntary powers to deprave their natural instincts to any considerable extent ; and therefore they remain, from birth to death, and from generation to generation, subject to the law of instinct, and with little deviation from their truly natural dietetic habits. But man, possessing the mental and voluntary power to deprave his natural instincts, has exercised that power so freely and extensively, that he no longer seems to be able to discriminate between his truly natural and his depraved instincts and appetites ; nor to distinguish his artificial from his natural wants."

138. "Civilization and luxury," observes Thackrah,* "have depraved the stomach and perverted the taste. Habits of life, purely artificial, are successively formed ; and, by daily repetition, acquire a power which stifles the calls of instinct. The vitiated stomach has a craving as strong for its noxious stimulus, as the healthy stomach for requisite sustenance. Sir John Ross, speaking of the Esquimaux, observes : "One bad effect at least of their ignorance was displayed in their abhorrence of plum-pudding, with which we had vainly hoped to regale stomachs accustomed to find blubber a sweetmeat, and train-oil preferable to Maraschino."† Again he says, "Nor, assuredly, had these men, amid their blubber and their oil, their dirty habits and villanous smells, any reason to envy the refined tables of the south ; as, among those, they would not only have experienced disgust, but felt pity for our barbarism and ignorance ; while, if they had been induced to partake, it could have been only under the impulse of starvation."‡

* Lectures on Digestion and Diet, p. 54.

† Narrative of a Second Voyage in Search of a North-west Passage, p. 164.

‡ Ross's Narrative, p. 158.

§ "Habit has considerable effect in our decisions regarding the agreeable. The Roman *liquamen*, or *garum*, the most celebrated sauce of antiquity, was prepared from the half-putrid intestines of fish ; and one of the varieties of the *Οπός Σιλκιον*, or *laserpitium*, is supposed to have been the *assafetida*. Even at this time, certain of the orientals are fond of the flavor of this nauseous substance. Putrid meat is the delight of some nations ; and a rotten egg, especially if accompanied with the chick, is highly esteemed by the Siamese. In civilized countries, we find game in a putrescent state eaten as a luxury ; this, to those unaccustomed to it, requires a true education. The same may be said of the pickled olive and of several cheeses—the *fromage de Gruyère*, for example, so much esteemed by the inhabitants of continental Europe."—*Dunghison's Human Physiology* vol. 1. p. 115.

139. Such is the great power of habit over men, that it completely blinds their eyes to every true principle. That which was at first offensive, may become at length agreeable; and what was at first manifestly injurious, may become apparently indifferent, or even salutary; and as the majority of mankind enjoy a portion of health and comfort with which they are contented, the operation of remote causes escapes observation; and men become exceedingly unwilling to connect their sufferings with the things which constitute a large portion of their enjoyment; while the example of persons indulging in the same habits, and yet arriving at what is deemed extreme old age, still further confirms the delusion.

140. The following anecdote may serve further to illustrate these remarks: "Now that we have fallen on the subject of national tastes, we must not forget to describe the most atrocious compound ever presented to man in the shape of food. It is the Russian soup called 'Batinia,' which to English palates tastes worse than poison; but which these our allies, high and low of them, delight in as the greatest delicacy on earth. Hearing so much in its praise, we ventured once, and once only—for there is no fear of its being asked for a second time—to give a hint that we should like to make a trial of it. But ('O dura Russorum ilia!') the taste is not yet away from our lips; nor are we yet persuaded that the skin has returned to our throats. A plateful of this yellow liquid—it ought not to be called 'soup'—was placed before us, with a scum on its top, something like a thin coating of sulphur. Adventurously diving through the surface, what did we discover? Lumps of rotten sturgeon, slices of bitter cucumber, spoonfuls of biting mustard; in short, a concatenation of all the most putrid, most acrid, most villanous substances that nature produces. The witches' broth was nothing to it:

'Eye of newt, and toe of frog,
Wing of bat, and tongue of dog,'

would be delicacies most exquisite compared with these Russian horrors. But, though both smell and sight were well-nigh daunted, we resolved to persevere like men. We had begun the perilous adventure, and could not with honor draw back before taste had also been put to the proof. A spoonful of it was accordingly raised to the lips; when lo! besides other recommendations, it was found to be literally as cold as ice; for the mountain projecting above the surface, which we had innocently supposed to be some nice redeeming jelly, of Russian invention, turned out to be a lump of ice from the 'frosty Caucasus,' or some other vile place. That mouthful was the worst we ever swallowed. It would be impossible to depict the

looks of anguish which we—a party of deluded, inexperienced Englishmen—cast on each other. It took away the breath; tears rolled from our eyes; we were more than satisfied; we were humbled, silenced, overcome; and made a vow, before the whole company of strangers, never more to be lured into an attempt to make new discoveries in the adventurous region of Russian dishes.”*

141. “As to the statement, that the different portions of the human race appear to have enjoyed about an equal amount of health, vigor, and longevity, whether their food has been purely vegetable, or purely animal, or a mixture of the two, let it be understood that, so far as we are informed, no considerable portion of the human family ever intelligently adopted any particular mode of living, upon clear and well-ascertained physiological principles; and constantly and perseveringly, from generation to generation, adhered to a course of diet and general regimen, conformable to all the laws of life; but, on the contrary, nearly every thing in the nature, condition, and circumstances of man, from the first transgression to the present hour, has served to fix his attention continually on present enjoyment; with no further regard to future consequences than experience has taught him to be necessary, in order to avoid sudden destruction or intolerable distress; and hence, as we have seen, the grand experiment of the whole human family seems ever to have been to ascertain how far they can go in indulgence; how near they can approach the brink of death, and yet not die so suddenly and violently as to be compelled to know that they have destroyed themselves. Whether, therefore, men have subsisted wholly on vegetable or on animal food, or on a diet consisting of both, they have done so without any regard to correct physiological principles, either in relation to quality, quantity, or condition of their food; or in relation to other physiological wants and habits of the body, which are nearly as important to the general welfare of the system as the quality and condition of the food. If their climate and circumstances have been less favorable than others to health, vigor, and longevity, they have learned from experience how far, as a general rule, they must restrain their indulgences, and in what way they must regulate their habits and appetites, so as to secure life long enough for one generation to become the progenitors and nurturing protectors of another generation. And if their climate and circumstances have been more favorable than others to health, vigor, and longevity, they have also learned from experience how far they may go in indulgence, and still keep within the bounds necessary for the perpetuation

* *Bremner's Excursions in the Interior of Russia*, vol. 1.

of the race. So that in all cases, as a general rule, what they have wanted in natural advantages, they have made up in correctness of habits; and what they have possessed in natural advantages, they have squandered in erroneousness of habits. If their climate has been salutary, they have indulged the more freely in dietetic and other excesses. If their food has been congenial to their nature, they have balanced or counteracted its good effects by other things unfavorable to health, and vigor, and longevity; and, in this way, the whole human family, whether inhabiting frigid, torrid, or temperate zones; whether dwelling on high mountains, or in low valleys; whether residing in ceiled houses, or living in tents, or in the open air; whether subsisting on animal or vegetable food, or on a mixed diet of the two; whether eating their food in its simplest and most natural state, or cooked and prepared in the most complicated manner; whether confined to simple food and water, or indulging in every variety of condiments, and stimulating and intoxicating liquors and substances; whether moderate or excessive in quantities; whether cleanly or filthy; whether chaste or lewd; whether gentle or truculent; whether peaceful or warlike; have, in the great experiment to ascertain how much indulgence the human constitution is capable of sustaining without sudden destruction, so balanced their good and evil as to preserve, throughout the world for many centuries, very nearly a general and uniform level, in respect to health, vigor, and longevity. This statement, however, is general; and admits of many particular exceptions of individuals, and sects, and societies, and perhaps tribes; but these exceptions in no case militate against its truth as a general statement, nor against any of the facts on which it is predicated. The fact, then, that a large portion of the human family actually have, for many centuries, and probably ever since the Flood, subsisted to a greater or less extent on animal food, and apparently done as well as those who have subsisted wholly on vegetable diet, does not, in any degree, invalidate the evidence of Comparative Anatomy: that man is, naturally and purely, a frugivorous animal.”*

* Graham's Lectures on the Science of Human Life, vol. II. p. 90.

CHAPTER IV.

SENSITIVE AND MORAL FEELINGS OF MAN.

142. THE last argument I shall introduce, in favor of vegetable diet, as the natural food of man, is founded on his sensitive and moral feelings; which, like his other instincts already noticed, (36.) are dependent on his organization, and inseparable from his nature. Every manifestation of pain and suffering, in a sensitive being, must at all times awaken the sympathies of the human heart; except in those who are constitutionally obdurate, or whose feelings have been blunted by repeated acts or scenes of cruelty and misery. Some there are who, like a Nero, can take pleasure in the sufferings of mankind and of inferior animals; but such are blots upon the fair creation of God, and are unfit for the society of those who long for the universal reign of happiness, peace, and benevolence. Can we suppose, then, that the Deity would have implanted in the human breast such an aversion to the taking of life; such a horror of shedding blood; and such a heart-sickness on witnessing it; such a hatred of cruelty, and such a sympathy with creatures writhing with pain, if he had intended us to feed upon the flesh of slaughtered animals? Would he not rather have formed us cruel and ferocious, like all carnivorous animals, which seem to derive pleasure from witnessing the sufferings of their victims? Or has the All-wise Creator departed from that harmony of design so conspicuous in all his works, and rendered necessary for man's support a food, the procuring of which shall do violence to the best and kindest feelings of his nature; shall be continually weakening and tending to exterminate the attributes of benevolence, mercy, and love; and gradually defacing the image in which God created him? Could he intend that the human race should eat their food with compunction; that every morsel should be purchased with a pang, and every meal empoisoned with remorse? No! Consistency runs through all the works and designs of God! We have already seen, that the organization of man, so far as the procuring, masticating, and digesting of food are concerned, is strictly adapted to a vegetable diet; and his sensitive and moral feelings confirm the views we have taken, and are in direct harmony with all other parts of his system.

143. Much of the feeling manifested in this chapter will doubtless be attributed to a state of morbid sensibility; and it must be acknowledged that all the sentimental faculties, as well as the propensities, are liable to abuse, and may be the cause of much unnecessary sorrow, when not directed by the intellectual powers. But an enlightened benevolence will endeavor to avoid each extreme, and neither give pain to its possessor at the sight of imaginary torture, nor yet render him insensible in the presence of actual suffering, whether in man or brute. I cannot agree with Shal¹ care, who says:

"The poor beetle that we tread upon,
In corporal sufferance finds a pang as great
As when a giant dies;"*

because we know that the inferior development of its nervous system renders it not so acutely sensible to pain as the higher classes of animals: we also know that the inferior classes experience comparatively little inconvenience from the loss of one or two of the limbs. But there can be little doubt that most of the more highly organized animals, such as various divisions of the vertebrata, which form so large a portion of human food, and whose nervous system is so similarly developed to our own, are acutely sensible both of pleasure and pain, and suffer dreadfully from the brutality of man, who abuses them in his service, hunts them for amusement, or kills them for food. Till it can be shown, therefore, that organized beings, with a nervous structure similar to our own, do not in reality suffer from the wounds and bruises which we inflict on them, a rightly constituted mind will believe that "the feelings of the heart point more unerringly than the dogmas and subtleties of men, who sacrifice to custom the dearest sentiments of humanity."

144. How few of those who feed upon the flesh of slaughtered animals are aware of the enormous amount of excruciating pain that is inflicted to satisfy their unnatural appetites! But the scenes of the slaughter-house are seldom, if ever, witnessed by those whose feelings are likely to be wounded by the struggles and cries of dying animals; and "what the eye sees not, the heart feels not."

"Witness the patient ox, with stripes and yells
Driven to the slaughter, goaded (as he runs)
To madness; while the savage at his heels
Laughs at the frantic sufferer's fury, spent
Upon the guiltless passenger o'erthrown."†

* Measure for Measure, Act 3, Scene 1.

† Cowper.

145. In all parts of the world where flesh-meat is used for food, the art of torturing dumb animals for the purpose of pampering a perverted appetite is carried to such an extreme as to shock any sensitive mind.

"Creation's groans through ocean, earth and sky,
Ascend from all that walk, or swim, or fly."*

146. Even in the warm climate of Abyssinia, a marked penchant exists for raw flesh cut out of an animal alive, and while the fibres are yet quivering. Not only Bruce, but Pearce and Coffin, who remained in the country and became intimately acquainted with the manners of the people, give shocking details of the cruelty that is there practised. The favorite portion is called the *shulada*, and is cut out, on each side, from the buttocks, near the tail. As soon as these are taken away, the wounds are sewed up by these surgical butchers, and plastered over with cow-dung. The animal, which had been thrown down before and during the operation, is now allowed to rise, and is driven forward on his journey. The fashionable parties at Gondar, the capital of Abyssinia, are served with *brinde* or raw meat, with the same hospitable feeling as, in our part of the world, they would be with venison-chops done just to the turn. The animal—a cow or a bullock—is brought to the door, and the dainty pieces cut off in the manner above described. But on this occasion the animal is killed; before doing which, all the flesh is cut off in solid square pieces, without bones or much effusion of blood. Two or three servants are then employed, who, as fast as they can procure the *brinde*, lay it upon cakes of teff placed like dishes down the table, without cloth or any thing else beneath them. The fast-days of these carnivorous and licentious people, misnamed Christians, amount to no less than a hundred and sixty-five in the year. The fast is only preserved, however, until about three o'clock in the afternoon, after which, they make up for their former reserve."† In some parts of the East, animals are cruelly whipped to death to render their flesh tender.

147. "The celebrated pâtés de fois gras prepared at Strasbourg are made of the livers of geese, artificially enlarged by the cruel process of shutting the birds up in coops, within a room heated to a very high temperature, and stuffing them constantly with food."‡

148. A person lately passing through Leadenhall market, observed on a stall a chicken which, though it had been plucked, was still alive and in motion; while several others were undergoing the same process. When the gentleman remonstrated with those who were thus torturing the poor

* Poetical Works of James Montgomery. Vol. iv. p. 184.

† Dr. John Bell on Regimen and Longevity, p. 59.

‡ Murray's "Hand Book for Travellers on the Continent." (1834.)

creatures, he received nothing but abuse in return. The following article, as well as many others of a like character, has appeared in the newspapers: "CONVEYANCE OF CALVES.—Notwithstanding the strenuous exertions of the Royal Society for the Prevention of Cruelty to Animals, to promote a more humane conveyance of these animals to and from the various markets, we are often compelled to witness cart-loads of calves closely packed together, with their legs tied tightly, and their heads hanging down over the back and sides of the carts, tossing to and fro, and knocking against each other with great violence. They are frequently conveyed in this torturing position, thirty, forty, and even fifty miles, and when examined at their journey's end, many are found dead." We also read of various acts of torture resorted to for the purpose of compelling animals to obey the wills of their tormentors; such as sawing their tails, and, what is still worse, dislocating every joint of their tails; and the agents of the above-named Society have frequently to interfere in such cases. Doubtless, such acts of cruelty are unnecessary, and animals might be killed for food without causing them so much pain even as they might suffer by a natural death, but I fear there is little chance of inducing the general adoption of milder treatment and more expeditious processes than are at present employed. The opinions of others on this subject may not be unacceptable to the reader.

149. "Nothing can be more shocking and horrid," says Pope, "than one of our kitchens sprinkled with blood, and abounding with the cries of creatures expiring, or with the limbs of dead animals scattered or hung up here and there. It gives one the image of a giant's den in romance; bestrewed with scattered heads and mangled limbs."

150. Diogenes observed, that "we might as well eat the flesh of men as the flesh of other animals." And Cicero remarked, that "man was destined to a better occupation than that of pursuing and cutting the throats of dumb creatures."

151. Plutarch remarks, "How could man bear to see an impotent and defenceless creature slaughtered, skinned, and cut up for food? How could he endure the sight of the convulsed limbs and muscles? How bear the smell arising from the dissection? Whence came it that he was not disgusted and struck with horror, when he came to handle the bleeding flesh, and clear away the clotted blood and humors from the wounds? We should, therefore, rather wonder at those who first indulged themselves in this horrible repast, than at such as have humanely abstained from it."

152. Dr. Cheyne says, "I have sometimes indulged the conjecture, that animal food, and *made* or artificial liquors, in the original frame of our

nature and design of our creation, were not intended for human creatures. They seem to me neither to have those strong and fit organs for digesting them, (at least such as birds and beasts of prey have that live on flesh,) nor those cruel and hard hearts, or those diabolical passions which would easily suffer them to tear and destroy their fellow-creatures: at least, not in the first and early ages; before every man had corrupted his way, and God was forced to exterminate the whole race by a universal deluge; and was also obliged to shorten their lives from nine hundred or a thousand years to seventy."

153. "To see the convulsions, agonies, and tortures of a poor fellow-creature," continues Dr. Cheyne, "whom they cannot restore or recompense, dying to gratify luxury, must require a rocky heart and a great degree of cruelty and ferocity." "I cannot find," adds he, "any great difference, on the foot of natural reason and equity only, between feeding on human flesh and feeding on brute animal flesh, except custom and example. I believe some rational creatures would suffer less in being fairly butchered, than a strong ox or red deer; and in natural morality and justice, the degrees of pain here make the essential difference." * "But animals, in our degenerate age, are every day perishing under the hands of barbarity without notice, without mercy; famished, as if hunger were no evil; mauled, as if they had no sense of pain; and hurried about incessantly from day to day, as if excessive toil were no plague, or extreme weariness were no degree of suffering. Surely the sensibility of brutes entitles them to a milder treatment than they usually meet with from hard and unthinking wretches. Man ought to look on them as creatures under his protection, and not as put into his power to be tormented. Few of them know how to defend themselves against him as well as he knows how to attack them. For a man, therefore, to torture a brute, shows a *meanness of spirit*, (particularly, if he is slaughtering it for the table.) †

154. Dr. Hawkesworth observes, "Among other dreadful and disgusting images which custom has rendered familiar, are those which arise from eating animal food. He who has ever turned with abhorrence from the skeleton of a beast which has been picked whole by birds or vermin, must confess that habit alone could have enabled him to endure the sight of the mangled bones and flesh of a dead carcass which every day cover his table; and he who reflects on the number of lives that have been sacrificed to sustain his own, should inquire by what the account has been balanced; and whether his life is become proportionably of more value by the exercise

* Cheyne's Essay on Regimen.

† See Dean of the Future Life of Brutes.

of virtue and piety, by the superior happiness which he has communicated to reasonable beings, and by the glory which his intellect has ascribed to God." *

155. Were a person under the necessity of killing all the animals whose limbs he devours, then would he more frequently be led to ask whether that food could be natural to him, the procuring of which does such violence to other parts of his nature. His sympathies would then be a greater check upon his desires for flesh; and he would more frequently be induced to satisfy his hunger with the rich, abundant, and delicious products of the vegetable world. But if we shrink from the task of taking life ourselves, and shun the scenes of cruelty inflicted by others upon dumb animals, why should we by our gross, unnatural appetites render it a work of necessity to our domestics and those who supply our larders? Far be it from me to infer that either a butcher or a sportsman is necessarily more cruel than another man, either to his own species, or to the animals he slays for our food. Many of those whose business it is to destroy life are known to be humane and merciful, and would spare unnecessary pain to the beasts they kill; but it cannot be denied that there are others thus employed who become callous and unfeeling; utterly regardless of the pains they thoughtlessly, or even wilfully, inflict. Young people early trained to the habit of taking life, gradually lose all sympathy for the beasts they ill-treat; and the direct tendency of such constant employment is to blunt the feelings and deteriorate the whole character. If, then, by our flesh-eating habits, such duties become necessary, we are virtually culpable not only for causing much pain and misery to the animal creation, but also for corrupting the morals of our fellow-creatures, and for giving birth to much brutal ferocity. It is, therefore, our duty, and, as will hereafter be shown, our interest—for real duty and true interest always harmonize—to discountenance the slaughter of any part of the animal creation for our food.

156. The Gentoos rear numerous herds of cattle; but such is their veneration for these animals—on account of their useful and patient services to man—that to kill or even maim one of them is deemed a capital offence." † "Among the Wallachians, though there is no positive institution to the contrary, yet the women never destroy the life of any creature. Whether this custom was founded by some of their ancient legislators, or whether it originated from incidental circumstances, is uncertain; but however that may be, nothing can be more suitable to the gentleness and

* Edition of Swift's Works.

† M. De Page's Travels, vol. ii., p. 27.

timidity which form the most beautiful and engaging part of the female character." *

157. Beasts of prey shun the light, as if ashamed of their cruelties.

"Not so the steady tyrant man;
 Who—with the thoughtless insolence of power,
 Inflamed beyond the most infuriate wrath
 Of the worst monster that e'er roamed the waste—
 For sport alone pursues the cruel chase,
 Amid the beamings of the gentle day.
 Upbraid, ye ravening tribes, our wanton rage!
 For hunger kindles you, and lawless want;
 But, lavish fed, in nature's bounty rolled,
 To joy at anguish, and delight in blood,
 Is what your horrid bosoms never knew." †

158. "Can there be a more gratifying spectacle," observes Dr. Roget, "than to see an animal, in the full vigor of health and the free exercise of its powers, disporting in its native element, revelling in the bliss of existence, and testifying by its incessant gambols the exuberance of its joy?" Yet cruel man—to gratify an acquired habit, which (as I shall hereafter show) only mars and abridges his existence—cuts short their innocent pleasures, and causes them to agonize to no useful purpose. "By long habit and familiarity with scenes of blood, men at length view them without emotion; but observe the young child which is told that the chicken it has fed and played with is to be killed: are not the tears it sheds, and the agonies it endures, the voice of nature itself, crying within us and pleading the cause of humanity?" "The merciful man is merciful to his beast;" and the man of sensibility "will hate the brutal pleasures of the chase by instinct: it will be a contemplation full of horror and disappointment to his mind, that beings capable of the gentlest and most admirable sympathies should take delight in the death-pangs and last convulsions of dying animals."

159. There is no antipathy between man and other animals which indicates that nature has intended them for acts of mutual hostility. Numerous observations of travellers and voyagers have proved, that in uninhabited islands or in countries where animals are not disturbed or hunted, they betray no fear of men: the birds will suffer themselves to be taken by the hand; the foxes will approach him like a dog." These are no feeble indications that nature intended him to live in peace with the other tribes of animals.

* Dr. W. Alexander's History of Women, vol. 1, p. 366.

† Thomson's Autumn, L. 390.

160. There are circumstances, however, which will justify man in taking animal life if care be taken to prevent all unnecessary suffering. These circumstances appear to me well enumerated by the poet Cowper :

"The sum is this: if man's convenience, health,
Or safety interfere, his rights and claims
Are paramount, and must extinguish theirs.
Else, they are all—the meanest things that are—
As free to live, and to enjoy that life,
As God was free to form them at the first,
Who in His sovereign wisdom made them all.
Ye, therefore, who love mercy, teach your sons
To love it too.*"

161. Ovid represents Pythagoras giving directions to the same purport :

"Take not away the life you cannot give ;
For all things have an equal right to live.
Kill noxious creatures where 'tis sin to save :
This only just prerogative we have :
But nourish life with vegetable food,
And shun the sacrilegious taste of blood."† 14

[NOTE 14. The flesh-eaters of New York—and probably the remarks about to be made will hold true in relation to many other cities—are not generally aware of the large quantity of spoiled or putrid meat which is sold in market, after having undergone a "doctoring" process, which restores its natural color, and takes away the putrescent smell. A few weeks ago, one of our daily papers, the *Tribune*, related the particulars of a "mercantile transaction," wherein a large lot of poultry which, in consequence of having been brought a long distance and a sudden change in the weather, had become black and fetid, was sold for \$50, or about one-tenth of a cent per pound. The purchaser soaked it in alum and otherwise managed it so that it sold for ten cents a pound, the "speculation" yielding a clear profit of some \$800. Beef, pork, and other spoiled and tainted meats are often treated in a similar manner, and sold for a "prime article." T.]

OBJECTIONS.

162. Several objections may here be noticed. "Why were sheep, oxen, &c., created, if not for the use of man?" I might briefly reply that they were brought into existence by the same power, and for a similar purpose, as all other animals; many of which man never knew, and probably never will know; and many others of which are absolutely injurious and de-

* Task, Book vi.

† Metamorphoses, Book xv., L. 706.

structive to him. At no time, perhaps, are the pride and imbecility of man more apparent than when he imagines all things, animate and inanimate, to have been created solely for his pleasure. There exist millions of suns with their revolving orbs, which the eye of man has never witnessed ; and myriads of animals, on this globe and others, enjoy their sports and pastimes unheeded and unseen by him : how, then, could they have been created for his use *

"Ask for what and the heavenly bodies shine,
Earth for whose use? Pride answers: 'Tis for mine!
For me kind Nature wakes her genial power,
Suckles each herb, and spreads out every flower; ..
Annual for me the grape, the rose renew
The juice nectareous and the balmy dew;
For me the mine a thousand treasures brings;
For me health gushes from a thousand springs;
Seas roll to waft me, suns to light me rise;
My footstool earth, my canopy the skies.'
Has God (thou fool!) worked solely for thy good;
Thy joy, thy pastime, thy attire, thy food?
Who for thy table feeds the wanton fawn,
For him as kindly spreads the flowery lawn.
Is it for thee the lark ascends and sings?
Joy tunes his voice, joy elevates his wings.
Is it for thee the linnet pours his throat?
Loves of his own and raptures swell the note.
Know, Nature's children all divide her care:
The fur that warms a monarch, warms a bear.
While man exclaims—' See all things for my use!'
See man for mine!'—replies a pampered goose.
And just as short of reason he must fall
Who thinks all made for one, not one for all."*

163. These lines of Pope convey much instruction ; and teach us, that all animals were created for their own enjoyment ; for mutual advantages ; and for the preservation of that universal harmony in nature to which all the varied forms of the animal, vegetable, and mineral kingdoms are made to contribute. Certain acari, pediculi, and entozoa, prey upon man, whose body (externally or internally) is their natural and only habitat : it seems necessary to their very existence. With much more apparent reason, therefore, might it be said, that man was created for these loathsome creatures, than that sheep, oxen, and other animals, were formed for his use ; since they are not indispensable to his health and happiness. Whatever man can press into his service, whether for food, raiment, or pleasure ; whatever can be made to minister to his necessities, real or imaginary ;

* Essay on Man. Epist. 1., l. 181.

these his pride and selfishness prompt him to believe were given solely for his use ; and because the flesh of gregarious and other animals is found to be nutritious, he concludes that the sole design of the Creator, in imparting vitality to them, was to supply him with food, clothing, and other conveniences : but few men who think seriously on the subject will consider the inference a just one.

164. But it will be said : " If we allow such animals to multiply, they will soon become so numerous as to consume the greater portion of the food required for the use of mankind." I reply, that so soon as they cease to be necessary to man, he will no longer increase their numbers by his fostering care ; and if they still continue so numerous as to interfere with his own comfort and happiness, he will either prevent their breeding so extensively, or kill them from necessity. I may also observe that the various races of animals, if left to themselves, are a check upon each other, and prevent the excessive multiplication of any particular kind : and thus by the irreversible laws of an all-wise Being is the balance of creation preserved. " Let nature follow her own course with regard to all that lives." The answer to this objection, however, may be safely deferred till time and circumstances shall require it.

165. Again ; it will be asked : " What shall we do for clothing, shoes, &c., if animals are not killed ?" When vegetable diet becomes so general as this question looks forward to, and when the supply is inadequate to the demand, the ingenuity of man will soon discover the means of introducing abundance of substitutes. In contemplating such extensive changes in the habits of a nation, it is well to have a prudent regard to consequences ; but such changes must necessarily be so slow and gradual, that any evil arising from them would be easily counteracted, long before it could be extensively felt. Besides, if the diet of a nation should become so totally altered that the flesh of animals is not at all needed, and yet their wool, milk, &c., indispensable ; numerous flocks and herds would doubtless be kept for the supply of those articles only ; as was the case in the time of the patriarchs, (23,) and as is the case now in some parts of Asia and Africa. (274.) The principal expense in keeping sheep is in rendering them unnaturally fat ; and if protected for their wool merely, the poorest lands, and such as are unfit for any other purpose, would be appropriated for their support. Thus fed, their wool would cost us no more than it does at present, and yet it would be of much better quality. Mr. Culley says that the Herefordshire sheep, which produce the finest wool, are kept lean, and yield one pound and a half each ; he adds : " If they be better kept, they grow large, and produce more wool, but of an inferior quality."

From a table furnished by Mr. Fison, a wool-sorter, it appears that, of fifteen tods or four hundred and twenty pounds of clothing-wool grown in Norfolk, in 1790, two hundred pounds were prime; while, in 1828, the same quantity of Norfolk wool only yielded fourteen pounds prime.* Other witnesses corroborated this statement.† If the whole or majority of a nation, therefore, should hereafter abandon the use of flesh diet, they would still have sufficient means in their power to provide themselves with warm clothing, either by the discovery of substitutes for wool, or by keeping animals for its production; and under a vegetable diet much more land would be available for such purposes. (506, 507.)

166. Another inquiry is: "How can the land be cultivated without the manure resulting from the keeping and feeding of sheep, oxen, &c.?" It is evident, I think, that these animals can return no more to the land than they take from it: consequently, if they be otherwise unnecessary to man, the land appropriated to their support may be employed in producing an extended supply of fruit, roots, grain, and other vegetables adapted to his wants. Yet the question will be reiterated: "Where is the manure to come from?" I profess not to be sufficiently acquainted with agriculture to answer this question so fully as it deserves; but it is well known to scientific inquirers, as well as to the best practical cultivators of land, that a considerable portion of our strongest and most valuable manures, both fluid and solid, are entirely wasted; and which, if properly economized, would far more than supply the loss we are supposing: in addition to which, we should have a considerable quantity from those animals which would be at all times protected for the production of milk, butter, wool, &c.; and, under a general vegetable diet, the land (as will be shown hereafter) would produce much beyond what man could require for his own consumption, even in this densely-populated country.

167. Again: from the rapid advances lately made in agricultural chemistry, it is perhaps not unreasonable to expect that, ere long, artificial manures may be produced so easily and so cheaply as to make up for any deficiency that may arise from the diminished numbers of gregarious animals.‡ Our knowledge of vegetable economy may become so complete, and our acquaintance with the wants of the various families of plants so intimate, as to enable us to supply them with the most appropriate kind of nourishment, and to cultivate them in circumstances the most favorable for developing their nutritive qualities in the highest perfection.

* Report of Evidence taken before the House of Lords, 1823, p. 207.

† Report, pp. 383, 640, and 644.

‡ Since the above was written, Professor Liebig has taken out a patent for several kinds of artificial manures, suited to different crops, and further discoveries may be expected.

168. Some persons, in justification of the slaughter of animals for human food, contend that the sum total of animal pleasure is thereby promoted ; since it encourages the breed of gregarious animals, and it is the duty and interest of their owner to feed and protect them : consequently, more animals are brought into existence than would otherwise be the case ; and their enjoyment overbalances the pains they are made to endure. It would, however, be a difficult question to determine whether animals thus multiplied, in order to supply our artificial wants, do actually experience more pleasure than pain, during the short period of existence we allow them. If we take into consideration the miserable way in which many of them are cooped up ; the mutilation which many others undergo, in order to destroy the instincts which nature bestowed upon them to enhance their pleasures ; the captivity which all have to submit to, contrary to their natural desires ; the privations they endure in consequence of inappropriate and insufficient food, in confined situations ; the diseases we entail on many, by abridging their freedom, and by confining them to food which they would not prefer were they more at liberty to seek out their own ; and the pain we cause them in a variety of ways, besides what they experience immediately before and at the time of slaughter ; the question as to the preponderance of pain or pleasure becomes, I think, too difficult for us to settle.

169. But if we are the means of bringing animals into existence, we do them injustice if we abridge their liberty, destroy their instincts, or prevent their enjoying any of those pleasures which nature has qualified them for receiving. If their flesh be not only unnecessary, but absolutely injurious to man, (as will be shown hereafter,) then every pain we inflict upon them is no less than wanton cruelty, and cannot be compensated by the pleasures we procure them. For the sake of argument, however, let us admit that the sum total of pleasure greatly exceeds the sum total of pain, in those animals which receive existence in consequence of our carnivorous habits : it will be proved, in another part of this work, that on a pure, substantial, and nutritious vegetable diet, a much greater population of human beings could be supported, in full health and strength, than on either an animal or a mixed diet ; and to provide means of comfortable subsistence and enjoyment for a rapidly-increasing human population, is an object as much more worthy our attention, as the varied pleasures and happiness of man are superior to the mere sensual enjoyments of the brute. It is true, that if vegetable diet were more general, fewer animals would be bred, and much of the present pasture-land would be appropriated to the production of fruit, grain, and roots ; but the means for obtaining the greatest amount of human happiness would be considerably increased.

It has been contended that man was naturally carnivorous, because in infancy he feeds on milk, which is an animal product. This argument would prove too much, because the young of all the Mammalia, not excepting the herbivora, are supported by milk; but who, on that account, would contend that the sheep and the ox are carnivorous? It would be equally logical to conclude that all animals are carnivorous because, anterior to birth, they derive their nourishment from the blood of the mother. Milk is wisely designed for the support of the Mammalia till teeth are supplied for the mastication of solid food.

170. I shall conclude this part of the subject with the excellent address of an ancient and distinguished priest of India: "Children of the sun, listen to the dying advice of your faithful and affectionate instructor, who hastens to the bosom of the great Allah, to give an account, and to enjoy the expected rewards of his services. Your regimen ought to be simple and inartificial. Drink only the pure, simple water. It is the beverage of nature; and not by any means, nor in any way, to be improved by art! Eat only fruits and vegetables. Let the predaceous animals prey on carnage and blood! Stain not the divine gentleness of your natures by one act of cruelty to the creatures beneath you! Heaven, to protect them, hath placed you at their head. Be not treacherous to the important trust you hold, by murdering those you ought to preserve; nor defile your bodies by filling them with putrefaction. There is enough of vegetables and fruits to supply your appetites, without oppressing them by carrion, or drenching them in blood."

PART III.

BEST FOOD OF MAN.

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CHAPTER I.

VEGETABLES CONTAIN ALL THE ELEMENTS AND QUALITIES NECESSARY FOR
THE COMPLETE NUTRITION OF MAN.

171. HAVING seen that history and science bear ample testimony to the truth, that vegetables *were* the original, and *are* (now as well as in former ages) the natural food of man, the inference that they are also his best food, seems unavoidable; but as evidence of a totally different nature from that already produced can be brought to prove the latter, independently of the two former propositions, the whole three may be considered established, as clearly and firmly as questions of such a nature admit. First, then, we must inquire, what important purposes food is designed to answer in the human economy; secondly, whether vegetables possess the elements and qualities necessary for answering those purposes; thirdly, we must ascertain whether they are easy of digestion; and, lastly, whether they are superior to animal food, or a mixed diet, for sustaining all the vital processes; for producing the "*mens sana in corpore sano*," in the greatest perfection, and for the longest period.

172. The life of all organized beings is a state of perpetual warfare with unorganized matter. No organized structure is, for a single moment, in a state of absolute repose; nor in two successive moments perfectly identical. The human body is every instant undergoing a change, and losing minute but innumerable particles of its substance. Every motion of our limbs, every manifestation of force, every sensation we experience from without, and every mental affection within, is accompanied by a transformation in the structure of the solids, and by changes in the chemical nature of the secreted fluids. The worn-out particles of the body are separated from the system, by means of various organs adapted to that purpose, in the form of excretions; as by the skin, lungs, liver, kidneys, adipose tissue, and intestinal canal. Thus, during life, an uninterrupted

series of transformations is constantly taking place ; and, consequently, the body would in a very short time become completely emaciated, the organs would gradually cease to perform their functions, and death would very soon put an end to all vital phenomena, unless fresh matter were supplied for renewing the parts that have undergone transformation.

173. It is in the ultimate tissue of the body, where the capillary vessels are spread out as a beautiful net-work, that the grand phenomena of life take place : here the whole body is in a state of constant mutation, of decay and reconstruction ; depending upon the joint influence of the oxygen of the atmosphere and the blood. The process seems to be as follows : When a quantity of atmospheric air has been received into the lungs by an act of inspiration, it there meets with the venous or dark-colored blood, which has arrived from all parts of the body, loaded with impurities. Several changes then take place. The carbonic acid, which is the cause of this dark color, is set at liberty ; and the protoxide of iron contained in the globules of the blood, becomes a peroxide, by uniting with a part of the oxygen contained in the air inhaled.* In this state, the blood (now of a bright red color) is conveyed, by the action of the heart, through the arteries, to all parts of the system ; and in those minute vessels termed "capillaries," the peroxide of iron gives off half its oxygen, and is again reduced to a protoxide,¹⁵ which combines with the carbon and hydrogen set free, in the same situation, by the decomposition of the tissues ; and the iron (in the state of carbonate) returns to the lungs, where it exchanges its equivalent of carbonic acid for one of oxygen, and is conveyed to the tissues as before. Thus we see that muscles, tendons, nerves, bones, nails, hair, and all the other solids and fluids of the body, (which are ever in a state of fluctuation,) derive their origin from that important fluid—the blood. This liquid flesh, (as it is sometimes termed,) as it passes through the capillaries, deposits the materials of each organ—be it muscle, nerve, or bone—wherever the decomposed particles require renewal ; and the same vital current, loaded with the products of chemical transformation—carbon, hydrogen, nitrogen, &c.—finds access to the various excretory organs, where these effete materials are given off ; and, after undergoing its last degree of purification in the lungs, it is returned again to the heart.

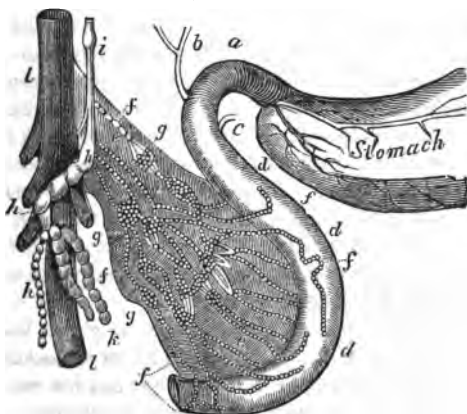
[NOTE 15. The doctrine that the color of the blood is owing to the presence of iron, is a mere hypothesis, assumed by many physiologists, but

* The fibrin, oxidized in the lungs, is, according to Mulder, the principal, if not the only, carrier of the oxygen of the air ; it is especially this substance from which the secretions are formed.—Simon's Animal Chemistry translated.—Dr. Day, vol. 1, p. 12.

which none of them have proved. Indeed, I think the balance of evidence is altogether against it. T.]

174. The blood is thus gradually exhausted by building up and renewing the solid structure of the body ; and itself requires constant renewal by daily supplies of food. This food is partially prepared for digestion, in the mouth, by mastication and insalivation ; it is then passed along the oesophagus into the stomach, where it undergoes various chemical changes, and is converted into chyme ; it then passes through an aperture at the right extremity of the stomach, called the "pylorus," into the duodenum, where it undergoes still further change, by the action of several secretions from the duodenum, liver, and pancreas ; it is finally elaborated into a white fluid denominated "chyle," which is taken up by minute vessels termed "lacteals," and passes along the thoracic duct, which terminates in an angle formed by the union of the internal jugular and subclavian veins. Thence it flows, mixed with particles of organized matter, lymph, and venous blood, to the heart, by which it is transmitted to the lungs, where all these different fluids are converted into one substance, arterial blood, to be sent out by the left side of the heart to the system, for its support. The principal purpose of food, therefore, is to supply nutriment to the body, in order to compensate for the waste constantly taking place from the decomposition of the tissues by the action of oxygen.¹⁶

FIGURE 31.



MAKING FOOD INTO BLOOD.

[NOTE 16. The process of blood-making is well illustrated in figure 31.

The stomach is represented pouring its properly digested contents through the *pyloric valve*, *a*, at its right end, into the *duodenum*, the first portion of the intestines. The ducts from the *liver*, *b*, and *pancreas*, *c*, are seen contributing their necessary juices to the chyme; and the *jejunum*, *d, d, d*, with its numerous *lacteals*, *f, f, f*, ready to absorb the required nourishment, to convey it along the *mesentery*, *e, e, e*, change it materially in the *mesenteric glands*, *g, g, g*, which appear something like knots of beads, and to deposit the fluid thus changed in the *receptacle of the chyle*, *h, h*, whence it passes up the *thoracic duct*, *i*, and is poured into the subclavian vein to be mingled with the venous blood. T.]

175. But there is also another important end to be answered by the proximate principles or ultimate elements contained in food: namely, the production of animal heat; without which all the varied functions of life would immediately cease. Azotized articles of food, termed also the "plastic elements of nutrition," and (by Dr. Prout) the "albuminous class of aliments," are generally believed to be specially and principally designed for the former purpose. They were found, by Mulder, to be modifications of a certain compound, which he has named "protein," (from *πρωτεῖω*, *I hold the first place*;) which is composed of carbon, hydrogen, nitrogen, and oxygen; as in the formula $C^{48}, H^{84}, N^6, O^{14}$, (Liebig.) The same chemist "has discovered two oxides of protein; a binoxide and tritoxide; both of which are formed in the animal economy, and constitute, when combined with fatty matter, the buffy coat of inflamed blood. He believes that the protein of the food reaches the right side of the heart, circulates through the lungs, and combines with oxygen; forming oxy-protein, (binoxide, tritoxide, or both;) this reaches the nutrient capillaries, and all or part is decomposed; the oxygen being employed for the disorganization of worn-out tissue, and the protein, thus deoxidized, being deposited to supply its place. If more protein be set free than is wanted for the growth of tissue, it passes unchanged into the veins, to be again oxidized in the lungs. The tritoxide of protein, being soluble in water, is better enabled to traverse the minutest capillaries than if it existed merely diffused through the fluid containing it."*

176. The azotized principles, fibrin, albumen or gluten, and casein, are capable of being assimilated, and converted into the various animal organs and tissues; and only differ from each other by small but essential quantities of mineral substances; such as sulphur, phosphorus, potash, soda, common salt, and phosphate of lime.

* Urinary Deposits, by Dr. G. Bird, p. 8.

177. The non-azotized principles are supposed to minister principally to the support of respiration and the production of animal heat. They are divided by Dr. Prout into two groups: the saccharine, comprehending sugar, starch, and gum; and the oleaginous, which includes oils, fat, and spirits. Liebig asserts, that the non-azotized principles are incapable of supporting life and nourishing the tissues; but his opinion on this point, as we shall see presently, is questionable.* It is pretty well ascertained, however, that one important use, to the Herbivora and to man, of substances containing these principles, is to supply carbon and hydrogen; which, by uniting with oxygen, produce muscular force and animal heat; if not supplied with these principles, their organs would be destroyed by the action of oxygen. Professor Liebig calculates, that about fourteen ounces of carbon are daily burned in the body of an adult man; and that sufficient heat is thus given out to maintain the temperature, and to account for all the gaseous matter and water expelled from the lungs. Although this view of the effects produced by the saccharine principles may be in the main correct, yet certain facts are scarcely reconcilable with their exclusive appropriation to the production of caloric. The diet of the inhabitants of the tropics, for instance, abounds with carbon and hydrogen, which would be likely to generate a much greater quantity of heat than could readily escape in the high temperatures to which they are exposed: it is probable, therefore, that a portion of these non-azotized compounds is converted into nutriment, by a union with the nitrogen of the atmosphere. (200.) We must inquire, secondly, whether vegetables possess the elements and qualities necessary for answering the purposes above mentioned.

178. Some years ago, when organic chemistry had been little investigated, it was generally supposed that vegetables were deficient in that important element termed "azote," or "nitrogen," which enters largely into the composition of the blood and flesh, or muscle, of all animals. It was therefore concluded, that vegetables are insufficient for the due support and renewal of the human body; and that the flesh of other animals is a necessary article of diet for man. Now, without the aid of chemistry, it is demonstrable that either the assumption or the inference is incorrect. For

* "If gelatine-sugar be in reality a compound of cane-sugar, in which one equivalent of urea has been substituted for one equivalent of water, it is highly probable that, when sugar is brought into the body as a substance, it may there form numerous combinations, and may by no means be destined merely to maintain the function of respiration. If gelatine be formed in the animal body, then sugar, either derived directly from the food, or produced from starch in the alimentary canal, may be used for this purpose."—Mulder's Chemistry of Vegetable and Animal Physiology, p. 286.

as the flesh of sheep, oxen, and other herbivorous animals, is acknowledged to contain as much nitrogen* as the flesh of man, I would simply ask: "Whence do they derive it? In whatever way they obtain the nitrogen, man may also acquire it, although he should never taste flesh; provided his organization be adapted for assimilating food of a vegetable nature, which has been already proved.† Now, in herbivorous animals, there appears to be only five possible sources of azote: 1. The vegetables upon which they feed. 2. The air swallowed with the food. 3. The converting powers of the secretions of the various viscera; as the stomach, liver, pancreas, &c. 4. The azote resulting from the decomposed tissues being again organized. 5. The atmosphere, by means of the process of respiration.

179. If we admit the conclusion of former chemists, that vegetables contain little or no nitrogen, then, whatever portion of this element the flesh of herbivorous animals contains, we must evidently refer to one or more of the four remaining sources; and to whichever of these we attribute it, we are bound to admit that man has equal facilities for obtaining it, even if confined to a vegetable diet. Let us first inquire, then, what light physiology throws upon the subject; and then proceed with an examination of the proximate and ultimate principles of vegetables.

180. The Herbivora swallow much more air with their food than the Carnivora; and Despretz has ascertained, by experiment, that the former expire more nitrogen than the latter; a fact which is inexplicable unless we admit that nitrogen can be supplied in larger quantities than the food itself contains. The Carnivora never masticate their food; but the Herbivora and man have teeth adapted to this purpose, by which means the food becomes intimately mixed with the saliva, which Liebig says possesses the property of enclosing air in the shape of froth, in a far higher degree than even soap-suds. "This air," he observes, "by means of the saliva, reaches the stomach with the food, and there its oxygen enters into combination,

* The recent researches of Messrs. Macaire and Marcet tend to establish the important fact, that both the chyle and the blood of herbivorous and of carnivorous quadrupeds are identical in their chemical composition; in as far, at least, as concerns their ultimate analysis. They found, in particular, the same proportion of nitrogen in the chyle, whatever kind of food the animal habitually consumed; and it was also the same in the blood, whether of carnivorous or herbivorous animals; although this last fluid contains more nitrogen than the chyle.—*Memoires de la Société de Physique et d'Histoire Naturelle de Genève*, v. 369. Roget's *Bridgewater Treatise*, vol. ii., p. 58.

† "Look at the elephant; whence is this mass of flesh derived? Fish and leeches, kept in glass vessels of pure water not only live, but increase in weight and size; now, as nitrogen is an abundant constituent of their structure, whence can it be derived, but from the air which exists in combination with the water?"—Dr. Searle's *Philosophy of Life, Health, and Disease*, p. 62.

while its nitrogen is given out through the skin and lungs, without being applied to any use in the animal economy." This last observation of Liebig seems to me supported by no evidence; nor can I for one moment admit, that nature would allow nitrogen to be incessantly passing through the various tissues of the body by means of the stomach and lungs, without answering some useful purpose. It is possible, therefore, that additional nitrogen may be supplied to the system by means of mastication and insalivation, when the food does not contain a sufficient quantity. Dr. Prout remarks: "This involution of azote may be considered as *one* of the great objects of mastication and insalivation, which are almost peculiar to animals chiefly subsisting on saccharine matters." Liebig also appears to have changed his opinion on this subject; he says: "When a chemical attraction causes the formation of a compound, it is in regard to the chemically active, or attracting body, quite indifferent whether the atoms which it attracts form a group, bound together by their mutual attractions, or are simply arranged near each other, without being combined. To produce the compound, it is only necessary that the attractive force should be more powerful than the forces which oppose its manifestation; that is, the formation of the new compound. If the attractive force preponderates, the attracted elements enter into the new combination: and this, whether they have been previously arranged in one, two, or three compound molecules or groups, and the result is exactly the same as if the attracting body had combined with one group of combined atoms." "The formation of the blood-constituents would have equally admitted of explanation, and would have been equally well explained, even had the food contained, instead of *one* sulphurized and nitrogenized constituent, *two* or *three* compounds, in one of which was found the sulphur, in the second the nitrogen, and in the *third* the carbon required to make up the sum of the elements."*

181. Chemists generally take it for granted, that food is the only means by which azote can be added to the blood, and that the animal body has no power to convert the non-azotized elements of food into azotized compounds. Certain physiologists, however, are of a different opinion, and believe that there may take place many changes and conversions in the mysterious vital laboratory of an animal which cannot be imitated in the unorganized laboratory of the chemist. It is probable that all organic structures have the power of reducing nutrient substances to the simple elements, and of recomposing them, by means of affinities controlled by the vital agency. It is not impossible, even, that during the vital process some of

* Liebig's Researches on the Chemistry of Food, p. 19.

the ultimate principles may be both decomposed and generated. This appears to be the opinion of Dr. Prout, who observes : " My belief is that, under certain extraordinary circumstances, the vital agents can form what we now consider as elements ; but that, in ordinary, such elements are chiefly derived *ab externo*, in conjunction with the alimentary principles." Again ; he states that, " under extraordinary circumstances, the assimilating organs may be able to decompose principles which are still considered as elementary ; nay, to form azote or carbon."

182. " It is, therefore, much more safe and philosophically accurate," says Sylvester Graham, " for chemists to say what inorganic forms or kinds of matter result from a chemical analysis of organic substances, than it is for them to state that organic substances are composed of such and such chemical elements, or kinds of matter. We know, it is true, that all material bodies are composed of that common matter of the world which chemistry has distributed into more than fifty elements ; and we know that, in manufacturing its various organic substances out of that common matter, the vital economy employs more of some of those elements than of others. We also know that some of those elements, or forms of matter, are much better adapted to the purposes of the living body than others ; but we have no right to assume that the vital forces possess no higher energies of analysis than are exerted by the chemical agents of the inorganic world, nor that their principles of combination, in any respect, resemble those of inorganic chemistry. On the contrary, we have reason to believe that vitality decomposes all those substances used in its economy which chemists call 'elements ;' and that in arranging its various organic substances and structures, the synthetical operations are very different from those of inorganic chemistry. It is, therefore, purely hypothetical to assert, that oxygen and carbon and hydrogen and azote, and other chemical elements, as such, combine, in the vital processes, to form the various substances and structures of the organic system."*

183. It is well known that the vegetable, being supplied with ammonia, can form gluten out of what would otherwise have been deposited as starch ; and Dr. Prout has distinctly stated, that he has found albumen (an azotized principle) in the duodenum, when none was found in the stomach ; from which circumstance he concludes, that a highly azotized substance may be secreted from the blood, either in the stomach or duodenum, or both, for the purpose of being united with the non-azotized constituents of the food, to form a compound adapted to the nutrition of the

* Graham's Lectures on the Science of Human Life. Vol. I, p. 81.

tissues. He also supposes that the portion of blood thus deprived of its azote is separated from the general mass of blood by the liver, as one of the constituents of the bile; which secretion, as a whole, is remarkably deficient in azote.*

184. Tiedemann and Gmelin,†¹⁷ as well as other physiologists, believe that the secretion of the pancreas adds to the chyme richly azotized animal substances, albumen, casein, and osmazone; by which it is brought nearer to the chemical composition of the blood, and prepared for its complete assimilation to it. Thus is a portion of nitrogen supplied to such alimentary matter as was originally destitute of it. Hence the large size of the pancreas, and the more copious secretion of the pancreatic fluid in herbivorous than carnivorous animals; hence the change that is said to be produced in the size of this organ by a long-continued change in the *habits* of the animal; hence, also, its smaller size in the wild-cat, which lives only on animal food, than in the domestic cat, which lives partly on animal and partly on vegetable food. It would seem, therefore, that the pancreas is a compensating organ, the function of which is to maintain a due balance of protein in the chyle, into which the chyme of the stomach is converted in the duodenum; and it is not improbable that the spleen exercises a similar office for the chyle, in its further progress. Müller thinks it probable that the spleen secretes lymph of a peculiar nature, which, being mixed with the contents of the lymphatic and lacteal system coming from other parts, tends to perfect the formation of the chyle. A large amount of fat, and a small quantity of fibrin, are found in the lacteals previously to their pass-

* "Long and repeated attention to the functions of the liver, both in health and disease, have satisfied me that this organ, in its assimilating functions, is analogous to, or identical with, the assimilative functions of vegetables; that the liver represents, in short, the original vegetative system, on which, in animals, the animal system is, as it were, superimposed."—**DR. PROUT.**

† MM. Bouchardat and Sandras conclude, from a variety of experiments, that the pancreas secretes the principle *diastase* for the purpose of dissolving the food of animals living on feculent or starchy substances, and the experiments of M. Lassaigne seem to confirm this opinion. It appears, however, from the more recent researches of Dr. Charles Bernard, that the special action of the pancreatic juice is on fatty matters; he regards it as indispensable for their absorption and for the formation of chyle. By a careful comparison of the experiments made by the parties just mentioned, and by MM. Mialhe, H. Meckel, Matteucci, Majendie, Andral, and others, we arrive at the following conclusions: Cellulose and amylose, or starchy elements generally, are converted by the saliva into dextrine and glucose; albuminous matters are assimilated by means of the gastric juice; the glucose, or grape-sugar, is changed by the bile into fatty matter, and the pancreatic fluid converts the fatty or oleaginous products into chyle, which is absorbed by the lacteals. That the oleaginous principle may be converted into most, if not all the matters necessary for the existence of animal bodies, seems to be proved by the well-known fact, that the life of an animal may be prolonged by the appropriation of the fat and other matters contained within its own body.

ing through the glands of the mesentery, and to their receiving the lymph from the spleen; after which the proportions are reversed. It appears, therefore, that the oleaginous principles of food are gradually converted into azotized principles, and that the fluid of the splenic lymphatics assists in effecting this change. Thus it would seem, that when in any circumstances the food of an animal does not contain the proportion of chemical elements proper for forming the blood, provision is made, in its complicated structure, for supplying what is deficient. The fact that blood contains more nitrogen than chyle, as proved by the experiments of Macaire and Marcet, further confirms these views. Whether the azote resulting from the decomposed tissues be susceptible of being again employed, when the supply by other means is insufficient, we have not the means of determining; but it is not unreasonable to conjecture that such may be the case.

[NOTE 17. It is very common for physiologists to affirm that animal fat, or oil, is highly nutritive; some authors using the term "*preëminently nutritious*." But there is abundant evidence to show that its nutritive value is extremely small. Animals fed on it exclusively become plump and *embonpoint*, yet soon die! Fat men do not endure hard labor, severe cold, nor long abstinence, as well as others; and the respiratory function is always of diminished capacity in fat persons. It is very true that the organic economy can manufacture all the oleaginous or adipose material the system requires out of the elements of ordinary food; hence there is no necessity for taking into the stomach those elements already formed into fat or oil.

T.]

185. The air we breathe is the next possible source of nitrogen. This substance is not a chemical compound, but a mechanical mixture, principally of two gases—oxygen and nitrogen, in the proportion of 23 parts of the former to 76 of the latter. The important agency of the oxygen in reference to the blood, and the mode of its action, have already been pointed out, (172;) but what becomes of the nitrogen? Does it answer no useful purpose in the animal economy? Is it, as some suppose, merely a diluent for the oxygen? Has nature, then, produced a gas nearly equal to four times the amount of the oxygen, for the simple purpose of moderating its effect on respiration, and of checking the progress of vitality? The supposition is unworthy of the wisdom exhibited to our view in every department of nature, where we invariably find two or three purposes accomplished by one arrangement.

"In human works, though labored on with pain,
A thousand movements scarce one purpose gain;
In God's, one single can its end produce,
Yet serves to second too some other use."*

186. It needs, therefore, but little experimental evidence to prove, that this nitrogen of the atmosphere fulfils some great design of the Creator; and, among others, that of supplying this element to the animal system, when not derivable in sufficient abundance from other sources.

187. Experiment shows, that there is a continual absorption of nitrogen by the blood; and as continual an exhalation of it. Sometimes the quantity absorbed exceeds the quantity exhaled; in which case the excess must have been, by some means, appropriated in the system; and if a chemical union takes place, in the capillaries, between the oxygen conveyed by the blood-globules and the carbon of the decomposed tissues; and if a part of the oxygen enters into chemical union with the blood, as is generally admitted, there is no reason why the nitrogen absorbed by the blood should not, in the same locality, enter into combination with the other elements of the blood, if an additional quantity of it be required.

188. The weak affinity existing between nitrogen and the other elements, even at high temperatures, seems the principal objection to the belief, that this gas can be appropriated in the human system. But it is a known property of nitrogen, that when it meets with hydrogen *in a nascent state*, within an enclosed space, it readily unites with the latter, and forms ammonia; and as hydrogen is developed, not only in the whole extent of the alimentary canal, but also in the capillaries, where the disintegration of the worn-out tissues takes place, we have all the conditions necessary for the combination of nitrogen with the other elements of protein. From the researches of MM. Bouchardat and Sandras it appears, that the digestion and absorption of albuminous matters take place exclusively in the stomach by the veins; and although the solution of fecula, or starch, also occurs in the stomach, its absorption takes place there less exclusively; which fact accords with the special disposition and length of the intestines of animals not carnivorous. Majendie found little hydrogen in the stomach one hour after food had been taken, and none at the end of two hours; whereas, in the small intestines, upwards of fifty per cent. of this gas was found; but at the expiration of four hours, only eight per cent. It is probable, therefore, that much of this element enters into combination with nitrogen in this locality, when the food consists principally of non-azotized principles.†

* Essay on Man, Epist. I., L. 58.

† Vide Liebig's Animal Chemistry, p. 823.

189. Dr. Prout thinks the azote of the tissues may, in some instances, be derived from the air; and Sir Humphry Davy states that, in his experiments, an absorption of nitrogen took place during respiration, to the amount of 1-17th of the volume of the oxygen which disappeared from the atmosphere; so that, in twenty-four hours, the quantity of nitrogen absorbed was as much as 2246 grains. Professor Pfaff, also, observed a diminution in the quantity of the nitrogen; and estimated it at from 1-107th to 1-80th of the volume of the air inspired.

190. Priestly, Cuvier, Dr. Henderson, Edwards, and others, obtained similar results; but Allen and Pepys, Berthollet, Jurine, Nyssen, Dulong, and Despretz, detected an increase of nitrogen. "Allen and Pepys ascertained, that when guinea-pigs were made to breathe in a mixture of hydrogen and oxygen, nitrogen was exhaled, and in a quantity exceeding the volume of the whole body of the animal, which shows that it could not be derived from the air previously contained in the lungs."*

191. Dr. Bostock observes, that it is probable the blood, as it passes through the lungs, both absorbs and exhales nitrogen; the proportion which these operations bear to each other being very variable, and depending upon certain states of the system, or upon the operation of external agents. The discrepancy in the results obtained by different experimenters upon this point, is also explained by M. Edwards in a similar way. He supposes that in certain circumstances, the *absorption* of nitrogen is most active; in others, the *exhalation*. These circumstances are probably dependent on the condition of the blood with respect to this necessary element; the absorption being greatest when the food and the alimentary organs have not supplied it in sufficient quantity for the requirements of the system. Absorption and exhalation of this gas seem also to take place by the skin; and Dr. Pereira has suggested, that the ammonia of the atmosphere may furnish nitrogen to the system; but there has been no experimental proof of this. The evidence already adduced is so much in favor of the opinion that the nitrogen contained in the tissues of man and the Herbivora may be obtained independently of food, that there is scarcely any room for doubt upon the subject; it may be considered an established fact, and in our investigations respecting human diet, it is of great importance that we should never lose sight of it.

192. That nitrogen in food is, to a certain extent, unnecessary to the support of man, we may infer from various well-authenticated facts. Adanson asserts, that the Nomadic Moors have scarcely any other food

* Müller's Elements of Physiology, Vol. I. p. 267.

than gum senegal. Hasselquist relates, that a caravan of Abyssinians, consisting of one thousand persons, subsisted for two months on a stock of gum arabic alone, which they found among their merchandise. Those who gather gum from the trees in Arabia and Senegal, live, for a time, almost entirely upon it; and six ounces in twenty-four hours have proved sufficient for a man's support. Humboldt informs us, that he has frequently observed the mule-drivers who carried his luggage on the coast of Oaraccas, giving the preference to unprepared sugar over fresh animal food; and it is well known that negroes, and individuals otherwise imperfectly fed, soon become fat and vigorous from masticating the sugar-cane. Now, gum and sugar contain little or no nitrogen. Potatoes and rice, also, are universally acknowledged to be far from the bottom of the nutritive scale; and yet the quantity of nitrogen present in them is extremely insignificant, compared with the amount in even the inferior qualities of wheat. "Maize is said to contain no gluten, and little, if any, ready-formed saccharine matter; whence it has been asserted to have but a very small nutritive power: on the other hand, it is seen that domestic animals which are fed with it very speedily become fat; their flesh being at the same time remarkably firm. Horses which consume this corn are enabled to perform their full portion of labor, are exceedingly hardy, and require but little care; and the common people of countries where Indian corn forms the ordinary food, are for the most part strong and hardy races."* (492, &c.)† If nitrogen, therefore, be necessary for the renewal of the tissues, it is evident that, in these instances, it must be supplied by one of the processes just mentioned, and not by the food.

193. But granting nitrogen to be a necessary element in human food, it is no difficult matter, since the late discoveries in organic chemistry, to prove that fruit, roots, grain, and all succulent vegetables, contain it in sufficient abundance. Boussingault and Payen, as well as other chemists, have ascertained that nitrogen is present in all parts of vegetables, particularly the seeds, juices, and nascent parts; the membranes being the only portions from which this principle is excluded.

194. Indeed, it is now no longer doubtful that all nutritive substances, whether of an animal or vegetable nature, contain a certain proportion of both the azotized and non-azotized principles; otherwise denominated the "glutinous" or "albuminous," and the "saccharine" or "saccharifiable"

* Library of Entertaining Knowledge, "Vegetable Substances used for the Food of Man," p. 101.

† Boussingault, Playfair, and Dr. E. D. Thomson, state the nitrogenized products contained in maize meal at 11 per cent.

principles. Both these are necessary to the saccharine or acetic fermentation which takes place in the stomach during the process of digestion; and all substances on which animals subsist may be proved, by chemical analysis, to contain these two principles, though in very different proportions; some containing an excess of the albuminous, and others of the saccharine principle. Dr. Prout has shown that milk, upon which the young of all the Mammalia feed, contains a considerable portion of an albuminous substance, (casein,) which forms its curd; a great quantity of oily matter, the butter; and no inconsiderable amount of sugar; thus including his three staminal principles.

195. The food of the Carnivora consists almost entirely of the compounds of protein; consequently, the carbon necessary for uniting with oxygen, in order to produce caloric, must be principally derived from the decomposition of the tissues; and, as the exercise of the vital functions is the only means by which the tissues can be decomposed, it is absolutely necessary that the Carnivora should take an enormous amount of muscular exercise, to furnish the requisite amount of carbon. Probably, however, so abundant a production of caloric is not so necessary to support animal heat in the Carnivora, as in the Herbivora and Frugivora; in consequence of the absence of perspiratory pores in the former, which prevents their cooling too rapidly.

196. The food of the Herbivora contains only such an amount of the compounds of protein as is sufficient to restore the waste of the tissues; and the carbon necessary for respiration is supplied by the starch, sugar, oil, &c., which form the greater portion of their food; the abundance of their perspiratory pores allowing the surplus of caloric to escape:* consequently, a much less amount of muscular exertion is necessarily required of them; though they are not on that account less capable of taking it, if requisite, as will be shown hereafter. In all articles used as food, and not artificially prepared, nature has combined not only the azotized and non-azotized principles, but also a certain amount of nutriment, with a large quantity of innutritious matter; and the latter is as necessary for healthy digestion as the former.

* The experiments of MM. Becquerel and Breschet seem at variance with the generally received opinion, that the animal heat is increased by the closing of the pores. The hair of rabbits was shaved off, and a composition of glue, suet, and resin, (forming a coating through which air could not pass,) was applied over the whole surface; when, instead of the temperature being increased, it was considerably reduced; and one of the animals died in consequence. Abundant evidence however may be adduced to prove that, in man, the cleaner the skin is kept, the more clothing, external heat, or muscular exercise, he requires to maintain his proper temperature.¹⁸

* [NOTE 18. I think there may be an error here. Certainly my experience and observation do not correspond with the statement. Many persons, I am aware, are in the habit of keeping their skins very clean by the frequent employment of vapor, warm or hot baths; a practice which tends to relax the system generally, and weaken the cutaneous function in particular, and thus render them more susceptible to the influence of cold. But those who practise cold bathing habitually and judiciously, and take warm or hot baths only occasionally, find the functional power of the skin so invigorated that they can bear cold better than those who keep unclean skins. T.]

197. The various kinds of flesh-meat (as beef, mutton, &c.) contain about 25 per cent. of nutritious matter; while rice, wheat, peas, and beans, afford from 82 to 92 per cent. Even potatoes, which are considered by many as a very innutritious kind of food, contain about 28 per cent of nutriment. (Appendix, Table B.) According to these estimates, one pound of bread, oatmeal, rice, or sago, contains more nutritious matter than three pounds of flesh, and a pound of potatoes as much as a pound of beef. These proportions of nutriment, however, though pretty accurately ascertained by chemists, are not to be depended upon as representing the correct ratio in which these various kinds of food support the human body; since much is said to depend upon the proportion of azotized and non-azotized principles in the aliments. Rice and potatoes, for instance, although containing a considerable quantity of nutritious matter, possess but little of an azotized principle, (from 2 to 8 per cent. of gluten;) and, therefore, are commonly deemed weak articles of diet: practical experience, however, contradicts this. (192, 492, &c.)

198. Nor are those articles which contain the greatest amount of protein the most nutritious and best for man; it having been proved that leguminous seeds, (such as peas and beans,) though containing more nitrogen than the cereal grains, are less nutritive. Liebig attributes this to their being deficient of the earthy phosphates; but numerous considerations lead us to infer that this cannot be the only cause. According to Braconnot, peas (*Pisum Sativum*) contain 9.26 grains of earthy phosphates in one ounce, which is about twice the quantity found in French beans or wheat, and twenty-four times the amount found in the same weight of beef.

199. On a careful consideration, therefore, of the compound aliments and their effects, we may very safely affirm that there is something more essential to nutrition than a mere mixture of what we regard as the most important alimentary principles of food. Wheat is acknowledged to

contain a considerable amount of gluten or vegetable albumen, and its fitness for human food has acquired for it the appellation of "the staff of life." "Grain and other nutritious vegetables yield us," says Liebig, "not only (in starch, sugar, and gum) the carbon which protects our organs from the action of oxygen and produces in the organism the heat which is essential to life, but also (in the form of vegetable fibrin, albumen, and casein) our blood, from which the other parts of our body are developed."

200. Notwithstanding the abundant proofs lately afforded by chemistry that vegetables contain all the elements necessary for nutrition, it has been stoutly asserted that their principles are very different from the fibrin, albumen, and casein of animal food, and that only the latter are calculated to form muscle and impart strength to the human frame. But the experiments of Liebig and other excellent chemists have established, beyond the possibility of a doubt, the perfect identity of animal and vegetable fibrin, animal and vegetable albumen, and animal and vegetable casein; each containing precisely the same amount of the azotized principle, protein. As to the starch and other saccharine matters which are found so abundantly in farinaceous vegetables, it is the opinion of Prout and Liebig that in the digestive process they are convertible into the oleaginous principles by the extraction of oxygen,* of which the former contain a much greater quantity than the latter. Thus the empirical formula of starch is C^{12}, H^{10}, O^{10} ; which, by the loss of one equivalent of carbonic acid ($C O^2$) and seven equivalents of oxygen, (O^7), is converted into C^{11}, H^{10}, O , the empirical formula of fat. Or the starch may be changed by vital chemistry into four equivalents of carbonic acid, (C^4, O^8), four equivalents of olefiant gas, (C^2, H^2), and two equivalents of water, (H^2, O^2). Or, if we admit that the nitrogen of the atmosphere combines, in the digestive process, with the elements of food,—of which there can be little doubt, (185,)—then four equivalents of starch may be converted into one equivalent of protein ($C^{12}, H^{12}, N^6, O^{14}$) and four of water, with a separation of oxygen. Thus, under a full vegetable diet, (in which starch abounds,) a sedentary life—especially if the pores of the skin are not kept open by frequent ablutions—will generally conduce to the formation of fat; but if abundant oxygen and nitrogen be supplied by exercise, a less amount of oxygen is then requisite from the food, and the chyle—which might, in other circumstances, have produced fat—may now be converted into fibrin to supply the waste of tissue arising from muscular exertion.

201. Here then is manifest a ray of that divine wisdom which shines so gloriously in every department of nature, when carefully investigated. We

* See note at § 184.

need no longer regard the nitrogen, which constitutes four-fifths of the atmosphere, as an inert and useless gas; but, like oxygen, as an important and essential aliment for the support of animal life. The two gases are held in a weak combination, or mechanical mixture, in order that each may in its turn, as circumstances require, subserve the interests of vitality. If animals were so constituted as to render necessary a precise amount of any element in the food to which their instincts direct them, and if their organs were so limited in their functions as to be incapable of fulfilling any other duty but that for which they were specially intended, then would life be subject to continual interruption; and disease and death would spread ruin and devastation in every direction. Neither men nor the lower animals are at all times so situated as to be able to procure, in sufficient quantity, that food which contains all the elements in the precise proportion and mode of combination best suited to their organization; the atmosphere, therefore, presents an immense reservoir, always at hand to make up deficiencies by means of mastication or respiration; and the digestive, chylopoietic, and secreting organs are endowed with such capabilities as to vary, within certain bounds, their proper functions, and to seize with unerring precision those elements of the atmospheric air of which the ingesta and circulating fluids are deficient.

202. These views are applicable to man living on a natural or vegetable diet as follows. In warm climates, where an elevated temperature is incompatible with great muscular exertion, nature has provided a bountiful and pleasant repast of fruit, rice, and other vegetables possessing a considerable proportion of carbon and hydrogen, and little nitrogen. By virtue of affinities modified by vital agency, these nutritive substances are formed (in the stomach, duodenum, &c.) into new compounds by a rearrangement of their elements and by a combination with those of the atmosphere; thus producing either protein or fat as the wants of the system may determine. If the tissues are wasted by exercise, more oxygen and nitrogen are supplied by the atmosphere, so as to prevent the formation of oleaginous compounds; and the albuminous principles that result are converted into fibrin to renovate the system; but if the occupations are sedentary, less fibrin is necessary; the deficient supply of air causes more oxygen to be separated from the food; and an increase of fat is the consequence, especially if the food be in excess. If a more azotized diet be indulged in, then—as there is less occasion for the formation of protein from the starch—the carbonaceous compounds must be eliminated by the skin, liver, and lungs; but, as the cutaneous surface, especially of the white variety of mankind, is not constituted for performing the additional duty now

demanded of it, and as in these circumstances there is a deficient supply of oxygen to the lungs, carbon accumulates in the blood; and the liver is called into an excessive exercise of its function in consequence of the inactivity of the skin and lungs. Hence the prevalence of hepatic diseases in hot climates.

203. In cold and temperate regions, wheat and other azotized products may be more freely indulged in, and the carbonaceous principles of food are then left at liberty for the respiratory function; muscular exercise becomes more easy and pleasant, and caloric is more abundantly formed. The inhabitants of these countries are more exposed to diseases of the chest and that numerous train of distressing complaints arising from the presence of an abnormal proportion of lithic acid in the system; such as gout, rheumatism, gravel, &c.¹⁹ The extreme indulgence in animal food, in these countries, becomes the predisposing cause of all these diseases, as well as of dyspepsia and liver-complaints. (313.) If flesh or other highly azotized food be taken with a very small proportion of starchy matter, the sufferings of the dyspeptic are alleviated, as every medical practitioner is aware; because there is then less carbon for the liver to separate; but this diet demands more exercise from the lungs in consequence of the diminished supply of oxygen from the food; hence its danger to persons who are threatened with phthisis, (256, 362, and 463,) as well as to gouty individuals, from its favoring the production of lithic acid. (316.) If the dyspeptic were entirely to abandon the use of animal food and adopt a diet of fruit and farinacea, not only would the disease be palliated as by the above treatment, but, in the generality of cases, entirely cured, without throwing an additional burden upon either the lungs or kidneys; the former having their labor remitted by the disengagement of oxygen from the food during the conversion of starch into protein; and the latter having less duty to perform in consequence of the diminished supply of substances containing protein ready formed. There is, therefore, no real contradiction in stating, that while a diet of lean animal food and bread, or a very sparing supply of vegetables, greatly relieves the dyspeptic, an exclusively vegetable diet is still more efficacious. (357.) Under the former, no greater quantity of the non-azotized principles is received than is necessary for the supply of the respiratory process and for the production of animal heat; the flesh yielding the requisite amount of albumen for the repair of the fabric. If the proportion of vegetable food be considerably increased, the nutrient matter will be in excess; and, consequently, the blood may become surcharged with carbon or nitrogenized principles, the former stimulating the liver, the latter the kidneys. Under

the exclusively vegetable diet, the non-azotized principles unite with the nitrogen of the atmosphere to supply the protein which is deficient in the food, thus preventing too great an accumulation of carbon; but in proportion as animal food is superadded, this conversion becomes unnecessary, and the surplus must be disposed of by other means; being transmuted either into fat or non-vitalized albumen; and thereby giving rise to hepatic complaints, scrofula, tubercles, gout, and other diseases.

- [NOTE 19. The general employment of impure or hard water is, doubtless, prominent among the causes of calculous or gravelly affections. A large proportion of the people of this country pay very little attention to the quality of the water they drink, provided it be cool and transparent. Since the introduction of Croton water into New York, calculous affections have rapidly decreased, whilst in South Brooklyn, where much of the water is very hard and impure, these affections, and also diseases of the kidneys, are comparatively common. T.]

204. Some have contended that a mixture of animal and vegetable food in certain proportions contains, within the least possible weight, all the chemical principles requisite for supplying the waste of structure, and for the production of animal heat; and that neither animal nor vegetable food, taken separately, answers the purpose so well, unless in much larger quantities. Presuming that a man taking moderate exercise requires eighteen ounces of starch and five ounces of albumen or gluten, &c., in twenty-four hours, Mr. Johnston* calculates that these will be best supplied by one and three-quarter pounds of bread, and half a pound of animal food. Thus:

	For Respiration.	For Waste of Muscle.
1½ lbs. of Bread, yielding 18 oz. of Starch, and 3 oz. of Gluten.		
½ lb. of Beef, " " "		2 oz. of Fibrin.
Total consumed by Respiration and the ordinary Waste, 18 oz. Starch, and 5 oz. of Gluten and Fibrin. ²⁰		

[NOTE 20. I think the argument above alluded to is completely refuted by the fact, now acknowledged by all the chemists, that *all nutriment is formed by vegetables*; animals having the power to *appropriate* almost every thing that is nutritious, but not to *create* any thing. T.]

205. This calculation is based on the supposition that wheat-flour contains 15 per cent. of dry gluten; and as Mr. J. says, 1½ lbs. (or 28 oz.) of bread contain 3 oz. of gluten, the same as 20 oz. of flour, we learn that he considers 20 oz. of flour to make 28 oz. of bread. But in a previous table

* James T. W. Johnston's Elements of Agricultural Chemistry and Geology.

(page 229) he informs us that 15,000 lbs. of wheat contain 825 lbs. of starch, 315 lbs. of dry gluten, and 60 lbs. of sugar. Now, divide each of these numbers by 15, and we find that flour contains 21 per cent. of gluten, and about 60 per cent. of starch and sugar. With this correction we have :

1½ lbs. of Bread — 20 oz. of Wheat-Flour, yielding 12 oz. Starch, and 4 1-5 oz. of Gluten.

½ lb. Beef, yielding 2 oz. of Fibrin.

Total.—12 oz Starch, and 6 1-5 oz. of Gluten and Fibrin.

206. There now appears a deficiency of 6 oz. of starch, and a surplus of 1½ oz. of gluten, when bread and beef are taken. Again : 2 lbs. of bread yield 13½ oz. of starch, and 4½ oz. of gluten ; leaving a deficiency of only 4½ oz. of starch, to be supplied by potatoes, rice, &c., and ½ of an oz. of gluten ; so that from Mr. J.'s own data, 2½ lbs. of beef and bread do not supply the required amount of starch and albumen, so well as two lbs. of bread ; and this is precisely the weight of bread that has been found practically sufficient for a man taking ordinary exercise. Vogel says, wheat-bread contains 53.5 per cent. of starch ; consequently, 2 lbs. will contain $17\frac{1}{10}$ oz. of starch, only $\frac{9}{10}$ of an oz. short of the requisite quantity. "Good wheaten bread," observes Dr. Carpenter, "contains more nearly than any substance in ordinary use, the proportion of azotized and non-azotized matter which is adapted to repair the waste of the system, and to supply the wants of combustible material, under the ordinary conditions of civilized life in temperate climates ; and we find that health and strength can be more perfectly sustained upon that substance than upon any other taken alone."

207. Organic chemistry, however, has not yet been brought to such perfection as will enable us to mete out man's food by its laws. We have yet much to learn in this respect, and a short notice of the subject is introduced here only to show that from the vegetable kingdom may be selected, for human food, such articles as will bear a comparison with a mixed diet, so far as our present knowledge will permit us to judge, and that the light already thrown upon the matter by chemistry is sufficient to prove that fruits, grain, roots, and other esculent vegetables, if used in a natural, unrefined, and unconcentrated state, contain every principle necessary for the nourishment of man.

208. Various substances may contain all the principles necessary to complete nutrition, and yet be either partially or totally indigestible, arising from a deficiency of relation between those substances and the organs of assimilation. Thus grass may be indigestible in the stomach of a lion, while to the ox it proves a wholesome and nutritious aliment. The organs of digestion in man, also, are subject to determinate physical laws ;

but being of an intermediate character (as has been previously shown, 75) between the carnivorous and herbivorous animals, their functions admit of a wider range; and though not so perfectly adapted to the digestion of flesh as the assimilating organs of the tiger, nor formed with so direct a relation to herbaceous matter as those of the sheep or the ox, habit will enable man to subsist, with tolerable health, upon certain kinds of either, or a mixture of both. But it has been shown (80, &c.) that the appropriate food of man is fruit, roots, and grain; and these not only admit of the easiest solution in the human stomach; but also create the least inconvenience through the whole of the alimentary canal, produce the healthiest chyle and purest blood. I am aware that some persons have questioned the fact of vegetable food being so easily digested in the human stomach, and have instanced various functional disarrangements from the eating of fruit, &c. Dr. Cullen said he had known portions of apple eructated without alteration, two days after they had been swallowed, and such cases undoubtedly occur; yet Dr. Beaumont found that apples are easily digested in the stomach, requiring only about an hour and a half for the purpose.

[NOTE 21. It is an every-day occurrence for patients, on first entering a Water-Cure institution, to find almost every thing eatable disagree with their stomachs, especially fruits and the cruder vegetables, as turnips, cabbage, &c. But the great majority soon find these articles not only to agree, but to feel pleasant and prove salutary. When simple, plain, coarse vegetable or farinaceous food, or ordinary fruit, seems to disagree with the stomach, the fact is proof positive that the stomach is in an abnormal condition. T.]

209. Various causes may be assigned for the indigestion of such articles of diet. I shall only mention what I consider to be the three principal: 1. The habit of indulging in a totally different kind of food; for it is proved that the change from a bad or inferior kind of diet to a better or more natural one, often causes temporary inconvenience, if this change do not take place by degrees; because, by a wise economy of nature, the gastric juice is always secreted of such a character as is best adapted to the solution of the food we habitually feed upon; (82:) indulgence in any unusual kind of diet, therefore, may sometimes disorder the stomach, even though the food be more natural than what, from habit, is said to agree better with the stomach. Kittens, (as previously mentioned, 104,) when brought up on vegetable diet only, have been rendered sick when made to eat flesh, the food designed for them by nature. Hence we see the necessity of making all great changes in diet with caution, and by

degrees; that the gastric juice and other secretions may be gradually adapted to the new circumstances.

210. 2. Most people, in this country, eat their fruit at the most objectionable time possible; namely, after a full meal of animal food, and a host of other incongruous mixtures. When the stomach has been already gorged with a variety of fish, flesh, and fowl, with rich sauces, condiments and vegetables, need there be any surprise that the vegetable pectin and acids of fruits should create disturbance in the stomach and alimentary canal? Surely every thinking man would expect such a result. But the whole blame is laid upon the fruit, instead of being attributed to the proper cause—the injudicious mixture of ingredients.

211. 3. The third cause of indigestion from fruit, is imperfect mastication and insalivation. It was shown (62, 63) that neither the cheek-teeth nor the under jaw of carnivorous animals is formed for mastication; nor are their salivary glands large, or the secretions from them copious. These animals, therefore, tear their food, and swallow it without chewing; and if man would be carnivorous too, let him follow their example, and save his teeth. But fruit and other vegetable food is so far different from flesh, that it requires careful mastication, and mixture with saliva, previously to deglutition; otherwise it may remain long in the stomach before the gastric juice can effect its complete solution. The character of the molar teeth in man and herbivorous animals proves that nature intended fruits and vegetable food to undergo these processes; but if these substances be received into the stomach without previous preparation, along with seeds, flakes of integument, &c., they will excite a rapid motion of the stomach, (as shown by the experiments of Schultz,) and will be propelled into the duodenum before the necessary changes have been effected. Vegetable matters thus hurried into the small intestines, create considerable disturbance, which is often referred to the acidity of the fruit. Having undergone little or no change in the stomach, the duodenal changes are necessarily imperfect; hence the development of gases, increased secretion from the alimentary tunics, and spasms. But the experiments of Dr. Beaumont and of others prove, that when fruits, roots, and farinaceous substances have been well masticated and mixed with saliva, they are easily digested in the healthy human stomach, and answer all the purposes of complete nutrition.*

* Perfect health is only consistent with a due performance of all the functions; to secure which, each organ should have its full share of duty assigned it, in order that its normal power and energy may be preserved. It is universally admitted that any organ may be weakened by excess of labor, and its powers may be debilitated by a superabundance of duty requiring constant action but little energy. The muscular power of the giant may be

212. A short statement of facts from Dr. Beaumont's Tables will confirm these remarks. He informs us that the following articles were converted into chyme, or digested, in the times mentioned :

	H. M.
Rice, boiled soft	1 0
Apples, sweet and ripe	1 30
Sago, boiled	1 45
Tapioca, Barley, stale Bread, Cabbage, with Vinegar, raw, boiled Milk and Bread and Milk, cold	2 0
Potatoes, roasted; and Parsnips, boiled	2 30
Baked Custard	2 45
Apple Dumpling	3 0
Bread-corn, baked; and Carrots, boiled	3 15
Potatoes and Turnips, boiled; Butter and Cheese,	3 30
 Tripe and Pig's Feet	 1 0
Venison, broiled	1 35
Codfish, boiled; and Eggs, raw	2 0
Turkey, Goose, and Lamb	2 30
Eggs, soft-boiled; Beef and Mutton, roasted or boiled; and Oysters, raw	3 0
Boiled Pork; stewed Oysters, Eggs, hard-boiled or fried	3 30
Domestic Fowls and Ducks, roasted	4 0
Wild Fowls; Pork, salted and boiled; Suet	4 30
Veal, roasted; Pork, and salted Beef	5 30

Our second question (177) is, I think, now sufficiently answered; it being demonstrated, upon the strictest chemical principles, that vegetables do possess the elements and qualities necessary for renewing the decomposed tissues of the body.

EXPERIMENTS OF MAJENDIE AND OTHERS.

213. How is it, then, that we hear of the failure of various attempts to support life upon a simple and non-azotized diet? The experiments of Majendie, Burdach, Tiedemann and Gmelin, Dr. Stark, and others, are any thing but satisfactory upon this point; although they are, in most physiological and dietetic works, adduced as complete proofs of the necessity for azotized food, variety in diet, and (more especially) for the mixture of ani-

enfeebled by incessant employment in actions requiring only the force or muscular capabilities of the child. So it is with the stomach; highly elaborated substances are chosen, and additionally semi-digested in cooking, in order to spare nature the trouble of putting forth her vital energies. She does not, therefore, labor where nothing is given her to work upon; but the organism which she would have employed is a sad loser by its insignificant exercise. It misses of robustness and steady forcefulness. In manhood, the demands upon it are great, but its capacity is exceedingly limited. Nature's simple fare of fruits and grain soon becomes altogether unsuited to its weakness; and at last indigestion, which is but another name for the inertness of the digestive organism, inflicts its irremediable disorders upon its impotent victim."—*Healthian*, p. 52.

mal and vegetable products in the food of man. Majendie fed dogs upon sugar and distilled water; the consequence was that, in the course of a few days, they became diseased; and died in about a month. He also fed some dogs upon olive oil and water, some on gum, and others on butter; and in each of these trials, death took place in the course of four or five weeks.* Tiedemann and Gmelin fed geese, one with sugar and water, another with gum and water, and a third with starch and water: they all gradually lost weight, and died in the course of three weeks or a month. None of the substances on which these animals were fed, contained nitrogen: the experiments, therefore, are thought by some to demonstrate the necessity for azotized food. The following experiments show the fallacy of such a conclusion. Majendie fed a dog on *white* bread and water; but it did not live more than fifty days, although the gluten with which white bread abounds is as highly nitrogenized a product as any of the albuminous class of aliments. Tiedemann and Gmelin fed a goose on boiled white of egg, cut into small pieces; and, notwithstanding that the animal was in this case fed on pure albumen, it died on the forty-sixth day. Dogs fed on cheese alone, or on hard eggs, lived for a long time, but they became feeble and thin, and lost their hair. Animals fed exclusively on gelatine, the most highly nitrogenized principle of the food of the Carnivora, die with all the symptoms of starvation: in fact, the gelatinous tissues are incapable of conversion into blood.^{†‡}

[NOTE 22. All such experiments must appear exceedingly absurd to an intelligent physiologist, who also understands the philosophy of diet. Food is a compound of several proximate principles; starch, sugar, casein, albumen, fibrin, &c., as these are compounds of ultimate elements, carbon,

* M. C. Chossat has lately made seventeen experiments on dogs; and ascertained, that in some cases sugar tended to fatten the animal, and in others turned to bile. In the first case there was generally a tendency to constipation; in the others, the bowels were relaxed. He also observes that milk, as well as sugar, has a tendency to fatten or to create bile, according to the different systems of the persons who use it exclusively, or make it a principal article of food; and that where bile is thus created, diarrhœa ensues, and leads to a wasting of the solids. Where the digestion is feeble, excess of nutrition, instead of being absorbed generally into the system, turns to bile, and causes debility and wasting to a high degree.

† M. Majendie, in the report made by the gelatine committee, infers that as gelatine, albumen, and fibrin, separate or artificially combined, are incapable of permanently nourishing; while flesh (which consists of gelatine, albumen, fibrin, fat, salts, &c., combined according to the laws of organic nature) suffices, even in small quantities, for complete and prolonged nutrition, it is the "organic condition" which forms so important an element in the process. The same observations will apply to wheat and maize, the gluten of which is said to be the only proximate principle capable of supporting life, without being combined with some other principle. Gluten, however, may be regarded as a compound principle; containing some traces of secula, gum, &c.

oxygen, nitrogen, hydrogen, &c. Hence, when learned gentlemen "feed" dogs, cats, rabbits, geese, or humans on one of the constituents of an alimentary article, instead of the aliment itself, they do not, in the strict sense, give them any food at all. T.]

214. I might relate many other experiments of the same nature; but these are sufficient to prove that death, in the former instances, was not owing to the absence of nitrogen in the food. The death of these and other animals experimented on, is clearly attributable to one or both of the following causes: 1. The non-adaptability of the articles used as food to the structure and secretions of the alimentary organs. 2. The artificial and concentrated state of the substances attempted to be used as nutriment.

215. When inquiring respecting the natural food of man, I showed that the various animals are constructed with an evident adaptation to one kind of food, and with a certain range of adaptability to other varieties of diet; but it is evident to any one who will reflect, that the experiments I have just mentioned were conducted in direct violation of the physiological laws of adaptation; the carnivorous dog and the herbivorous goose being alike fed upon artificially produced, and, to them, totally unnatural substances. The results, therefore, might have been predicted, without any reference to the chemical character of the articles given them as food.

216. "Art alone," says Raspail, "furnishes us with non-nutritive substances, which it extracts from vegetables and from animals; for extraction is isolation. Now, when two things derive their qualities from their association only, then isolation must destroy them. To feed animals with substances produced by art, is very frequently to load their stomachs, while leaving them to die of hunger." An ass fed by Majendie on dry rice, and afterwards on boiled rice, lived only fifteen days; whereas a cock was fed with boiled rice for several months, with no ill consequences; evidently showing, that the very same substance may be insufficient nutriment to one animal, while it imparts health and enjoyment to another; the effects varying with the development of the alimentary organs.

217. But the greatest error in many experiments on the food of animals has consisted in the employment of substances too concentrated, or of abstract and isolated principles. "Like the atmospheric air," says Graham, "all substances designed for human aliment are composed of certain proportions of nutritious and innutritious matter; and the alimentary canal, like the lungs, is constituted with determined relations to the constitutional nature of alimentary substances in this respect. There is somewhere a

point of truth, in the proportions best adapted to the constitution and functional powers of the alimentary canal, and the vital welfare of the whole system; and so far as we vary from this point of truth, by increasing or diminishing the proportion of the nutritious to the innutritious matter of our food, we do, as a general fact, injure the alimentary canal, and through it the whole body. And it is very certain, that too great a proportion of nutritious matter in our food is little less dangerous to our digestive organs, and to the vital interests generally, than too small a proportion. Every thing in the anatomical structure and physiological powers of the alimentary canal clearly and fully demonstrates, that it is constituted with wise and determinate relations to natural alimentary substances, composed of nutritious and innutritious matter. And all experience corroborates this demonstration. It is the duty of the alimentary canal to receive these substances, at proper times, and in proper quantities, after they have been thoroughly masticated and insalivated in the mouth; and completely to dissolve them, or separate their nutritious from their innutritious matter, and convert their nutritious matter into chyme; and present this to the absorbing mouths of the lacteals; and then to remove the fecal or innutritious residuum from the organic domain." "If, therefore, instead of supplying the alimentary organs with food composed of due proportions of nutritious and innutritious matter, we artificially separate the nutritious from the innutritious, and supply the alimentary organs with the concentrated nutritious matter only, we shall soon destroy the functional powers of the organs, break down the general function of nutrition, and cause atrophy and death."* Combe observes, that "farinaceous and other concentrated aliments do not afford the requisite stimulus to the muscular fibres of the intestine; because they are in a great measure absorbed, and leave little to be thrown out."

218. Many recorded experiments illustrate these remarks. The dog fed by Majendie on white bread and water, died in the course of seven weeks; but another fed by him on brown soldiers' bread (*pain de munition*) did not suffer. When dogs were fed on sugar and water, they died in a month; but if a considerable portion of saw-dust be mixed with the sugar, their health will not be affected by it, although they are naturally carnivorous animals. It was also shown, that an ass fed on rice died in fifteen days; but if a large quantity of chopped straw had been mixed with the rice, he would have continued to live and be well. "Horses fed exclusively on meal or grain will die in a short time; but mix their meal or grain with a suitable proportion of cut straw or wood-shavings, and they will thrive and

* Graham's Lectures, vol. I., p. 540.

become fat. And it is an interesting fact, that if horses be fed on grain alone, with the exception of water, for a number of days, they will instinctively gnaw the boards, or whatever woody substance is within their reach." I might here give several well-attested anecdotes, in confirmation of what has been now stated; but the two following will be sufficient:

219. "About the 1st of December, 1800," says Capt. John Matthews, of Maine, "I left Bath, in the schooner Betsey, with a deck-load of cows, oxen, horses, and one mule. Expecting to have a short passage, I took but little hay. When we had been out several days, a gale came on, which swept away most of our hay, and drove us so far out of our course, that we were fourteen days without hay, before we made the island of Bermuda. We had plenty of corn and potatoes on board; with which we fed our stock. After three or four days, the stock all began to be indisposed, and to droop, and to be unwilling to eat the food we gave them; and they seemed to be very uneasy, and to crave something which they had not: and the mule began to gnaw a spruce spar which lay before him. This suggested to me the thought, that my stock all required more woody matter with their food; and I immediately caused some spruce and oak spars to be shaved up with a drawing-knife, and gave the shavings to the stock. All the young cattle and horses and the mule ate these shavings greedily; and were very soon improved in their health, and continued to do well the remaining part of the voyage. The mule ate them more freely than any other animal on board, and he improved most: indeed, he was quite plump and sleek when he arrived in port. Some of the older cattle and horses would not eat the shavings; and every one of these died before we got in. About the year 1830," continues Capt. Matthews, "returning from Bonavista, one of the Cape de Verd islands, I brought several goats with me. Having no hay on board, I fed them on grain and shavings. They came every day for their shavings, as regularly as they did for their grain; and ate them as greedily."

220. These observations on the concentrated nature of food are equally applicable to man as to the lower animals. Dr. Stark made many curious and whimsical dietetic experiments in his own person; and fell a sacrifice in the prosecution of his inquiries. The proposed object of his experiments was to prove that a *pleasant* and *varied* diet is more conducive to health than a simple one; yet most of the dishes of which he partook were neither natural simple, nor pleasant; but exceedingly disagreeable compounds of concentrated substances. He began with fine flour; bread and water; from which he proceeded to bread, water, and sugar; then to bread, water, and oil of olives; then to bread, water, and milk; afterwards

he tried bread and water with roasted goose ; then bread and water with boiled beef ; then stewed lean of beef with gravy ; then oil of suet and water ; then flour, oil of suet, water, and salt ; then flour, water, and salt ; then bread and fat bacon ; then infusion of tea and sugar ; then bread or flour, with honey and an infusion of rosemary. A number of other dishes equally disagreeable, and some of them more so, were successively tried. He was healthy and vigorous when he commenced his experiments, but he gradually declined, and at the end of nine months he died after much suffering.

221. Dr. Stark's experiments prove quite the contrary of what they were designed to establish ; and clearly show that concentrated alimentary substances, however varied, are destructive to health and life : this case might be urged, with much propriety, against too great a variety of food, and in favor of simplicity of diet. Even nations on whom science has not yet dawned are aware of the advantage of mixing innutritious substances with highly concentrated food. Thus the Kantschatdales, who are frequently compelled to live on fish-oil, judiciously form it into a paste with saw-dust, or the rasped filings of indigenous plants.

222. Much has been written, by physiologists, to demonstrate the necessity of variety of food—by which they generally mean a mixture of animal and vegetable substances ; and they quote many instances of ill effects arising from simplicity of diet. I am confident, however, that all the injurious effects that have been referred to simplicity of diet, have arisen from improper and unnatural food, or from food in too concentrated a state. Müller informs us, that in Denmark, a diet of bread and water for four weeks is considered equivalent to the punishment of death. There must be some fallacy in this statement ; but, if correct, the injury produced may perhaps be attributed to the extraordinary fineness of the flour, and the superabundance of gluten which it contains. Knight, in his *Physiological and Horticultural Papers*, says : " Bread made of wheat, when taken in large quantities, has probably, more than any other article of food in use in this country, the effect of overloading the alimentary canal ; and the general practice of French physicians points out the prevalence of diseases thence arising amongst their patients." All the evils said to be produced by living upon bread are due to our modes of refining upon nature ; and though it must be admitted that bread made from the finest wheaten flour, if eaten in great abundance, and without a due admixture with innutritious matter, will be productive of serious consequences to health, yet it can be shown, upon good authority, that many individuals have subsisted for years on coarse, undressed wheat-meal bread and water alone ; and have not only improved in health, but become remarkably vigorous and robust.

Children whose food, for a considerable time, consists of superfine flour-bread, arrow-root, and other concentrated substances, (such as sugar, butter, &c.,) may appear fat and well, but do not acquire strength: they generally become weak and sickly, and are often covered with sores. Hence, some physicians who have written on the diet of children, have spoken in severe terms against confining children to an exclusively vegetable diet. But if a child be put upon a diet of good bread made of undressed wheat-meal, with milk-and-water or pure soft water for drink, and be allowed to indulge pretty freely in the use of good fruits in their seasons, none of the evils which result from concentrated forms of aliment, or which are attributed to vegetable diet, will be experienced; but the child, if in other respects properly treated, will be healthy, and robust, and sprightly. (See case at 372.)

223. "Bulk," says Dr. Beaumont, "is nearly as necessary to the articles of diet as the nutrient principle. They should be so managed, that one will be in proportion to the other. Too highly nutritive diet is probably as fatal to the prolongation of life and health as that which contains an insufficient quantity of nourishment. It is a matter of common remark among old whalemén, that, during their long voyages, the coarser their bread, the better their health." "I have followed the seas for 35 years," said an intelligent sea-captain to Mr. Graham, "and have been in almost every part of the globe; and have always found that the coarsest pilot-bread, which contained a considerable proportion of bran, is decidedly the healthiest for my men." "I am convinced from my own experience," says another captain, "that bread made from the unbolted wheat-meal is far more wholesome than that made from the best superfine flour; the latter always tending to produce constipation." Captain Benjamin Dexter, in the ship *Isis*, belonging to Providence, R. I., arrived from China in December, 1804. He had been about 190 days on the passage. The sea-bread, which constituted the principal article of food for his men, was made of the best superfine flour. He had not been long at sea before his men began to complain of languor, loss of appetite, and debility: these difficulties continued to increase during the whole voyage; and several of the hands died on the passage of debility and inanition. The ship was obliged to come to anchor about thirty miles below Providence; and such was the debility of the men on board, that they were not able to get the ship under way again; and the owners were under the necessity of sending men down from Providence to work her up. When she arrived, the owners asked Captain Dexter what was the cause of the sickness of his men. He replied—"The bread was too good."

224. In Blackwood's Magazine for June, 1847, there is an excellent paper by Mr. Johnson, on the relative values of fine flour and the coarse meal. His estimates are as follow :

1. The fat. Of this ingredient, 1,000 lbs. of the

Whole grain contains	28 lbs.
Fine flour	20
Bran	60

2. Muscular matter. In 1,000 parts,—

	Whole Grain.	Fine Flour.
Wheat	156	130
Indian corn	140	110

3. Bone material and saline matter. In 1,000 lbs.,—

Bran contains	700
Whole meal	170
Fine flour	60

	Whole Meal.	Fine Flour.
Muscular matter	156	130
Bone material	170	60
Fat	28	20
Total in each	354	210

"To please the eye and the palate," observes Mr. J., "we sift out a less generally nutritive food, [does he mean what is generally considered a less nutritive food?] and to make up for what we have removed, experience teaches us to have recourse to animal food of various descriptions." "The husk may be considered to form one-eighth of the whole; hence, if the whole meal be used, eight people will be fed by the same weight of grain which only fed seven before. Again, we have seen that the whole meal is more nutritious; so that this coarser flour will go farther than an equal weight of the fine, namely, one-half more nutritive than the fine. Leaving wide margin for the influence of circumstances, let us suppose it only one-eighth more nutritive, and we shall have now nine people nourished equally by the same weight of grain, which, when eaten as fine flour, would support only seven. The *wheat of the country*, in other words, would in this form go one-fourth farther than at present. The mixture of the fine flour and the bran in reality increases the virtues of both."

225. These instances confirm the excellent observations of Dr. Prout, who says : " Of the numerous shapes assumed by lignin, the best adapted for excremental purposes is undoubtedly the external covering of the seeds of the *cerealia*, and particularly of wheat. Bread, therefore, made with undressed flour, or even with an extra quantity of bran, is the best form in which farinaceous and excremental matters can be usually taken ; not only in diabetes, but in most other varieties of dyspepsia accompanied by obstinate constipation. This is a remedy, the efficacy of which has been long known and admitted ; yet, strange to say, the generality of mankind choose to consult their taste rather than their reason : and, by officiously separating what nature has beneficially combined, entail upon themselves much discomfort and misery.* The mucous membrane of the stomach and intestines is, in some persons, so irritable, that it cannot bear furfureous substances ; and in such cases coarse bread should be adopted by degrees, or the green matter of the leaves of plants and the skin of fruit may form a proper substitute. " Debility, sluggishness, constipation, obstructions, and morbid irritability of the alimentary canal, have been among the principal roots of both chronic and acute diseases in civic life in all parts of the world, and in all periods of time ; and concentrated forms of food, compound preparations, irritating stimuli, and excess in quantity, have been among the principal causes of these difficulties."

CHAPTER II.

EXPERIENCE OF NATIONS AND INDIVIDUALS.

226. It will perhaps be objected, that these are new doctrines, which, if true, would have been long since discovered to be so. Yet were this the first time of proclaiming the truth, the cry of novelty ought not to negative the evidence adduced in its support. No pretensions, however, are made to originality ; for wise and good men in all ages have strenuously advocated the claims of a vegetable diet, and have strictly refrained from animal food. Such being the case, it may be asked why these claims have not been more generally acknowledged, and the diet more extensively adopted. Various reasons might be assigned for this. Few think it neces-

* *Nature and Treatment of Stomach and Renal Diseases*, p. 45.

sary either to investigate the subject, or to attend to it when introduced to their notice ; and many have neither time nor opportunity for giving it a proper consideration. It is long, therefore, ere a scientific truth can extend its influence over the mass of mankind ; particularly if of a practical nature, and opposed to long-established habits, which, if we have the desire, we have not the resolution to alter, on account of the pleasing associations of past enjoyment, and the ardent desire they have implanted for renewed gratification. Our daily meals, our social visits, our family ties, and our friendly intercourse with each other, all tend to strengthen and confirm our dietetic habits, whether right or wrong ; so that we are unwilling to listen to one who would introduce any material change, especially when it seems likely to subtract from our pleasures. No wonder, then, that the discoveries of science—with regard to health, happiness, and morals—make so slow a progress ; nay, even when the judgment of a generally accounted wise and rational man is convinced of an error in a dietetic habit, how seldom does it lead to reformation ! “There is a difference,” observes Chalmers, “between such truths as are merely of a speculative nature, and such as are allied with practice and moral feeling. With the former, all repetition may be often superfluous ; with the latter, it may just be by earnest repetition that their influence comes to be thoroughly established over the mind of an inquirer.” I have already quoted the opinions of some of our best anatomists and philosophers in support of the views advocated in this work ; and shall now mention a few more who have preceded me in the same cause.

227. Pythagoras, one of the most celebrated philosophers of antiquity, is the first we read of as defending a vegetable diet. He not only totally refrained from animal food himself, but also strictly prohibited the use of it by his disciples ; so that those who abstain from it, at the present time, are frequently called Pythagoreans. Pythagoras flourished about 500 years before the Christian era. He was a man of immense learning, and extraordinary powers of intellect : he was the first demonstrator of the 47th Problem of the First Book of Euclid ;* and entertained correct views of the solar system ; which views, slumbering for ages after his death, were at length revived by Copernicus in the fifteenth century. One sentence of his, which has become an English proverb, is enough to establish the character of the man : “Fix on that course of life which is the most excellent, and habit will render it the most delightful.” Ovid† represents him as arguing thus :

* “The square on the hypotenuse of any right-angled triangle is equal to the sum of the two squares on the base and perpendicular.”

† *Metamorphoses*, B. xv., l. 101.

"O mortals, from your fellows' blood abstain;
 Nor taint your bodies with a food profane!
 While corn and pulse by nature are bestowed,
 And planted orchards bend their willing load;
 While labored gardens wholesome herbs produce,
 And teeming vines afford their generous juice;
 Nor tardier fruits of cruder kind are lost,
 But tamed with fire, or mellowed by the frost;
 While kine to pails distended udders bring,
 And bees their honey redolent of spring;
 While earth not only can your needs supply,
 But, lavish of her store, provides for luxury;
 A guiltless feast administers with ease,
 And without blood is prodigal to please."

The poet proceeds to a much greater length than it is necessary here to transcribe.

228. Zeno the Stoic, Diogenes the Cynic, Plato, Plutarch, Plautus, Proclus, Empedocles, Socion, Quintus Sextus, Apollonius Tyaneus, Porphyry, and numerous others among the ancients, abstained from animal food; and more recently, Haller, Ritson, (celebrated for his numerous works and splendid talents,) Dr. Cheyne, Dr. Lambe, Mr. Newton, (who wrote a work entitled "Return to Nature,") Shelley, Dr. Hufeland, Sir Richard Phillips, Professor R. D. Mussey, of Hanover, U. S., Dr. James, of Wisconsin, Dr. Whitlaw, Dr. W. A. Alcott, of Boston, U. S., and many others, have both advocated and personally tried, for many years, a strictly and exclusively vegetable diet. Clement of Alexandria says of Saint Matthew, that "he abstained from the eating of flesh; and that his diet was fruits, roots, and herbs."* The Manichæans, a sect of Christians, religiously abstained from all kinds of animal food. Minutius Felix, who about the year 210 A.D. wrote an elegant dialogue in defence of the Christian religion, represents Octavius, the principal speaker, as saying: "We Christians dread the thoughts of murder, and cannot bear to look on a carcase: and we so abhor human blood, that we abstain from that of beasts." Descartes, at his table, in imitation of the good-natured Plutarch, always preferred fruits and vegetables to the bleeding flesh of animals.† The four most ancient orders of priests—the Rahans, the Brahmans, the Magi, and the Druids—confined themselves to vegetable food; as did also the Athenian prince Triptolemus, who established the Eleusinian mysteries, and prohibited by law all injury to animals: his words are, Ζῶα μὴ σίνεσθαι, (do not kill animals.)‡

* "Pædagogus," B. ii., c. i.

† Seward's Anecdotes, vol. ii. p. 171.

‡ Monthly Magazine, Feb. 1812, p. 21.

229. But the illustration of this subject is not limited to the practice of individuals; for whole nations, both ancient and modern, have subsisted during many generations on vegetable regimen: and it would be no difficult matter to prove, that a considerable majority of the human race seldom or never taste animal food. When Boadicea, Queen of the Ancient Britons, was about to engage the Romans in a pitched battle, in the days of Roman degeneracy, (A.D. 61,) she encouraged her army by an eloquent speech, in which she says: "The great advantage we have over them is, that they cannot (like us) bear hunger, thirst, heat, or cold. They must have fine bread, wine, and warm houses. To us, every herb and root are food; every juice is our oil, and every stream of water our wine." "In those terms," observes Lord Kaimes, "our fathers were robust both in mind and body; and could bear, without much pain, what would totally overwhelm us."

230. A considerable proportion of the laborers in various parts of England and Wales, even at the present day, eat but little animal food; and, about seventy or eighty years ago, the principal part of the labor, in this country, was performed by those who seldom or never tasted flesh-meat. It is true that, in the time of Queen Elizabeth, we read of animal food and flacons of ale even at breakfast; * but Sir F. M. Eden, whose elaborate researches have thrown much light on this subject, states that the substantiality of diet for which the sixteenth century was renowned, was confined chiefly to the tables of persons of rank. "A maid of honor," says he, "perhaps breakfasted on roast beef; but the ploughman, in those good old times, (as they are called,) could (I fear) only banquet on the strength of water-gruel." ("State of the Poor," vol. i. p. 116.)† It is calculated by Mr. McCulloch, that "on the most moderate computation, the consumption of butcher's meat in the metropolis even, as compared with the population, is twice as great at this moment as in 1740 or 1750.‡

231. The food of the native Irish was (principally, if not exclusively) vegetable, long before the potato was known in Europe. Nay, in almost

* "Notwithstanding all that is said," observes McCulloch, "of the rude hospitality, and of the consumption of ale and beer, in those remote times, it is abundantly certain that the laboring classes consume, at this time, ten times more malt-liquor than their ancestors ever did, in either the fifteenth or the sixteenth century."—*Statistical Account of the British Empire*, vol. ii. p. 496.

† "During several months, even the gentry tasted scarcely any fresh animal food, except game and river fish, which were consequently much more important articles in housekeeping than at present. It appears from the Northumberland Household Book, that in the reign of Henry VII. fresh meat was never eaten, even by the gentlemen attendant on a great earl, except during the short interval between Midsummer and Michaelmas."—*Macaulay*.

‡ *Statistical Account of the British Empire*, vol. ii. p. 497.

the first glimpses we have of them, they are represented to us as herbivorous, *πομφάγοι*; for such is the expression of Solinus. So they continue to be described by Spenser, Hollingshed, and Camden. The latter says: "As for their meats, they feed willingly upon herbs and water-cresses; especially upon mushrooms, shamrocks, and roots." In which he is corroborated by Ware, the Irish antiquary, who wrote about the time when the potato was introduced. The food of the Irish peasantry of the present day is almost wholly composed of the potato, without any other vegetable; and only in favorable circumstances is it accompanied with milk. In reference to this diet of the Irish, it has been observed: "When I see the people of a country with well-formed, vigorous bodies, and their cottages swarming with children; when I see their men athletic, and their women beautiful, I know not how to believe them subsisting on unwholesome food."* It has even been stated, on authority which cannot be doubted, that rents have been raised because the tenant has been seen to eat "apple taters"—potatoes of the best sort—the landlord considering their quality too good for the consumer, who should have sold them for his benefit, and substituted coarser in their place.† I do not, however, name this by way of recommending a potato diet. Far from it. I sincerely wish that those poor but industrious creatures could obtain a plentiful supply of corn, rice, milk, fruit, &c.; the only object in naming the subject here, is to show upon what a scanty diet it is possible for the human frame to be supported. Dr. Smith, in his "History of Kerry," declares this food to be sufficient for preserving the Irish laborers in full health and vigor.

232. The hardy Scotch, also, are almost exclusively confined in their diet to the productions of the field and garden. "So late as 1763," says Mr. McCulloch,‡ "the slaughter of bullocks for the supply of the public markets was a thing wholly unknown even in Glasgow, though the city had then a population of nearly 30,000! Previously to 1775, or perhaps later, it was customary in Edinburgh, Glasgow, and the principal Scotch towns, for families to purchase in November what would now be reckoned a small, miserable, half-fed cow or ox, the salted carcase of which was the only butcher's meat they tasted throughout the year." At the period of their greatest simplicity, manliness, and bravery, the Greeks and Romans appear to have lived almost entirely on plain vegetable preparations; and at the present time, bread, fruits, and roots constitute the chief nourish-

* Young's Tour in Ireland, vol. ii., pt. 2, p. 88.

† Penny Cyclopædia, article "Food of Laborers."

‡ Statistical Account of the British Empire, vol. 2, p. 502.

ment of the Italians, and of the mass of the population of Southern Europe.

233. The Lazzaroni of Naples are a tall, stout, well-formed, robust, and active class of people; and yet subsist chiefly on coarse bread and potatoes; and their drink of luxury is a glass of iced water, slightly acidulated.

234. In France, a vegetable diet prevails to a very great extent. M. Dupin informs us that two-thirds of the French people, to this day, are wholly deprived of animal food, and live on chestnuts, or maize, or potatoes. The peasantry of Norway, Sweden, Russia, Denmark, Poland, Germany, Turkey, Greece, Switzerland, Spain, Portugal, and of almost every other country in Europe, subsist principally, and most of them entirely, on vegetable food.

235. The inhabitants of Asia and Africa are compelled by their climate to refrain in great measure from animal food. The Persians, Hindoos, Burmese, Chinese, Japanese, the inhabitants of the East India Archipelago, and of the mountains of Himalayah, and, in fact, most of the Asiatics, live upon vegetable productions. It has been maintained by Dr. Van Cooth, (no vegetable-eater himself,) in a learned medical dissertation, that the great body of the ancient Egyptians and Persians "confined themselves to a vegetable diet;" and the Egyptians of the present day, as well as the Negroes, (whose great bodily powers are well known,) live chiefly on vegetable substances. The Mexican Indians and South-Sea Islanders were formerly remarkable for their great temperance, and attachment to a vegetable diet, but they have recently been corrupted by the introduction of European customs. I might greatly extend the list of those who subsist on vegetable productions; but as they will be hereafter referred to, the mention of them here is unnecessary. It has been observed, that "from two-thirds to three-fourths of the whole human family, from the creation of the species to the present moment, have subsisted entirely, or nearly so, on vegetable food; and always, when their alimentary supplies of this kind have been abundant and of a good quality, and their habits have been in other respects correct, they have been well nourished and well sustained in all the physiological interests of their nature."

236. But it is not a sufficient recommendation of a vegetable diet to show that it has been adopted by nations as well as individuals. I shall therefore now point out a few of the many advantages of an exclusive adoption of it.²³

[NOTE 23. I cannot refrain here from alluding to the most common

objection to vegetarianism we meet with in this country; and I do so for the purpose of explaining it away. The objection is, that vegetarians are themselves poor specimens of health. And the answer is, that the great majority of those who are the subjects of notice and comment are invalids who are restricted to a vegetable diet, because they can recover health in no other way; and many of them are living on a strict vegetable regimen, because it is the only way they can live at all. At the various hydropathic establishments in this country the most desperate cases are put on a vegetable diet, simply because it affords them the best chance for getting well. The casual observer, who judges by appearances, will always find an argument in favor of flesh-eating in the fact that the best-looking persons, physiologically, are those who eat meat.

There are, however, in this country, particularly amongst the Bible Christians of Philadelphia, many persons of adult age who have never tasted animal food, and who will not suffer, as respects mental and bodily development, with the best specimens of flesh-eaters that can be found.

There are also, scattered over the United States here and there, specimens of humanity whose bodily vigor and mental capacity are conclusive in favor of vegetarianism, so far as the experimental evidence is concerned.

T.]

CHAPTER III.

FRUITS AND FARINACEA CONDUCTIVE TO HEALTH.

*O beata sanitas! te præsente amenum
Ver floret gratula, absque te nemo beatus.*

237. "A PHILOSOPHICAL friend once remarked to me," says Dr. Combe, "that he never considered himself to be in complete health, except when he was able to place his feet firmly on the turf, his hands hanging carelessly by his side, and his eyes wandering over space; and, thus circumstanced, to feel such agreeable sensations arising in his merely bodily frame, that he could raise his mind to heaven, and thank God that he was a living man." This is probably as brief and as correct a description of health as can be given; for the man in perfect health will possess that buoyancy of feeling, good humor, and satisfaction, which never fail to accompany the human organism when all the functions are in order: then

may a man with truth exclaim, "*Vivere ipsa voluptas!*" To acquire and preserve this equable and regular discharge of the various functions of the body, requires an originally good development of the organs, or constitutional stamina, and a strict fulfilment of the physiological laws of our nature.

238. These, however, we are not called upon to consider, except so far as diet is concerned; in reference to which it may be observed, that all food is both nutritive and stimulative; and upon the relative proportion of these two qualities in any article of diet, depends its power of producing the "*juste milieu*" of existence. If the stimulating property be in excess, the functions are abnormally accelerated, life flies too fast, pleasurable feelings are vivid but evanescent, and disease is frequently the result. If the nutritive properties prevail, the functions are sluggishly performed, a stupid state of indifference creeps over the frame, life is passed without animation, and actual pleasure appears to be unknown. There seems, however, no reason to doubt that each article of food, while in the state in which nature provides it, contains that just proportion of the two qualities which is requisite for the healthy discharge of the functions of the animal for the use of which it was provided, and the organs of which are in strict relation to the condition of its food. But if a diet be adopted by any animal, materially different from that to the digestion and assimilation of which its organs are strictly adapted, though the new food contain all the chemical elements necessary for the due nourishment of the animal, it is possible their mechanical combination—upon which, probably, the nutritive and stimulative qualities depend—may be such as to prevent its perfect assimilation. All animals do not require the same degree of stimulation for the attainment of that state of perfection of which their nature renders them susceptible; and, consequently, the food that may be admirably adapted to the wants and necessities of one, may be quite inadequate to the due development of another.

239. Now, though grain and other vegetables contain the same proximate principles as the flesh of animals, (namely, albumen, fibrin, and casein,) yet these must be in a different state of combination in the two kinds of diet; for it is universally admitted, and daily experience proves the fact, that animal food is much more stimulating than vegetable food; and if the latter contains such a proportion of the stimulative quality as is sufficient to maintain man in perfect health, then every additional degree of stimulation—whether derived from the flesh of animals, or from such articles as are stimulative without being nutritious (as spirits, wine, &c.)—must be injurious to health. But as slight deviations from health are little noticed,

and as the seeds of disease are generally sown long before any serious attack is experienced, few refer their complaints to the real causes, and usually blame any little indiscretion which immediately precedes actual pain. It was well observed by Hippocrates, that "diseases do not fall upon men instantaneously, but, being collected by slow degrees, they explode with accumulated force." Hence it is that none, except those who have paid great attention to the subject, are ever led to suspect that the flesh which they and others are daily in the habit of eating can be in any way connected with their sufferings.

240. It may be shown—both from the opinions of medical writers, and from numerous well-attested examples—that vegetables are sufficient for maintaining man in a perfectly healthy condition.

241. Haller—a first-rate botanist, an eminent physician, and a profound philosopher—says: "This food, then, which I have hitherto described, and in which flesh has no share, is salutary; insomuch that it fully nourishes a man, protracts life to an advanced period, and prevents or cures such disorders as are attributable to the acrimony or grossness of the blood."* The celebrated Dr. Hufeland¹ taught, that a simple vegetable diet was most conducive to health and long life. Sir William Temple—after noticing the customs and habits of the Patriarchs, the Brahmans, and the Brazilians—says: "From all these examples and customs it may probably be concluded that the common ingredients of health and long life are, great temperance, open air, easy labor, little care, simplicity of diet—rather fruits and plants than flesh, (which easily corrupts,) and water; which preserves the radical moisture, without too much increasing the radical heat. Whereas sickness, decay, and death, proceed commonly from the one preying too fast upon the other, and at length wholly extinguishing it."

242. Porphyry, (444,) when addressing Firmus Castrius, who had relinquished Pythagorean abstinence, says: "You owned, when you lived among us, that a vegetable diet was preferable to animal food, both for preserving health and facilitating the study of philosophy; and now, since you have eaten flesh, your own experience must convince you that what you then confessed was true. The use of flesh does not contribute to health, but rather prevents it; since health is preserved by the same measures by which it is restored: but it is restored by the use of the lightest food, and by abstinence from flesh; and consequently health is preserved by the same means. A quiet state of mind is of the utmost importance to the maintenance of health, and a light and spare diet contributes greatly to the same end."

* Haller, *Elem. Phy.*, vol. vi. p. 199.

243. Tyron, who wrote "The Way to Health," says: "I am sure that a man may make a better meal with half a pennyworth of wheaten flour made into pap, and half a pennyworth of bread to eat with it, and a little salt, and be as strong, briak, and able to perform any labor, as he that makes the best meal he can, with either flesh or fish; so great is the ignorance, folly, blindness, false opinion, and custom of those that call themselves learned." Again he says: "If all men would refrain eating of flesh, there would be no cause to complain for want of food: for the Almighty has, in all particulars, been gracious and bountiful unto all creatures, but more especially unto mankind; for whom he has *spread a plentiful table*; furnishing the whole earth with a great multitude or variety of herbs, fruits, grains, and seeds, fit for food; which do afford a nourishment of a most excellent substance, and far beyond flesh." Dr. Adam Smith, in his "Wealth of Nations," says: "It may indeed be doubted whether butcher's meat is anywhere a necessary of life. Grain, and other vegetables, with the help of milk, cheese, and butter, or oil, (where butter is not to be had,) it is known from experience can, without any butcher's meat, afford the most plentiful, the most wholesome, the most nourishing, and the most invigorating diet."*

244. In the "Anatomy of Abuses," published (in 1583) by Stubbes, we find the following quaint observations respecting articles of diet at that time: "I marvel how our forefathers lived, who eat little els but colde meates, grosse, and hard of digesture? Yea, the most of them fead upon graine, carna, rootes, pulse, hearbes, weedes, and such other baggage; and yet lived longer than wee, were healthfuller than wee, of better complexion than wee, and much stronger than wee in every respect; wherefore i can not perswade myself otherwise, but that our niceness and curiousness in diet hath altered our nature, distempered our bodies, and made us subject to millions of disoracias and diseases, more than ever were our forefathers subject unto, and consequently of shorter life than they. Doe wee not see the poore man, that eateth browne bread (whereof some is made of rye, barlie, peason, beanes, oates, and such other grosse grains) and drinketh small drink, yea, some tymes water, feedeth upon milke, butter, and cheese, (i saie) doe wee not see suche a one healthfuller, stronger, fairer complexioned, and longer livying, then the other that fare daintilie every daie? And how should it be otherwise?"

245. Dr. Cheyne, whose opinion has been previously quoted (152) on the natural food of man, further observes: "For remedying the distempers of the body, to make a man live as long as his original frame was designed

* Vol. III. p. 367.

to last, with the least pain and fewest diseases, and without the loss of his senses, I think Pythagoras and Cornaro by far the two greatest men that ever were: the first by vegetable food and unfermented liquors; the latter by the lightest and least of animal food, and naturally fermented liquors. Both lived to a great age. But, what is chiefly to be regarded in their conduct and example, both preserved their senses, cheerfulness, and serenity to the last; and, which is still more to be regarded, both at last dissolved without pain or struggle, after a great age of perfect health. A plain, natural, and philosophical reason why vegetable food is preferable to all other food is, that, abounding with few or no salts, being soft and cool, and consisting of parts that are easily divided and formed into chyle, without giving any labor to the digestive powers, it has not that force to open the lacteals, to distend their orifices, and excite them to an unnatural activity, to let them pass too great a quantity of hot rank chyle into the blood, and so overcharge and inflame the lymphatics and capillaries, which is the natural and ordinary effect of animal food; and, therefore, cannot so readily produce diseases. There is not a sufficient stimulus in the salts and spirits of vegetable food to create an unnatural appetite or violent cramming; at least, not sufficient to force open and extend the mouths of the lacteals more than naturally they are or ought to be. Such food requires little or no force of digestion; a little gentle heat and motion being sufficient to dissolve it into its integral particles. So that in a vegetable diet, though a delightful piquancy in the food may sometimes tempt one to exceed in quantity, yet rarely, if spices and sauces (as too much butter, oil, and sugar) are not joined to seeds and vegetables, can the mischief go farther than the stomach and bowels, to create a pressed load, sickness, vomiting, and purging, by its acquiring an acrimony from its not being received into the lacteals; so that, on more being admitted into the blood than the expenses of living require, life and health can never be endangered by vegetable diet. But all the contrary happens under a high animal diet."

246. Dr. Craigie, who has recently published an excellent work on the practice of physic, says: "Diet consisting of animal food is not requisite, either to preserve health or maintain strength; and diet of articles from which the flesh of animals is together excluded, is perfectly adequate to the sustenance of the human body, in a state of good health and strength." Dr. James Mollenson (of View Bank, near Montrose, North Britain) says: "Thus it will appear, that it is under the use of a diet chiefly of grain, milk, and vegetables, or certain simple and innocent modes of regimen, that firm health and long life have, in the great plurality of instances, been enjoyed."

247. "I formerly believed, in common with the generality of mankind, that meat was an indispensable article of food, particularly to the laboring man, but have had abundant reason to change my opinion. I have had free intercourse for two or three years with a large number of physiological reformers, who subsist entirely upon vegetable food, and find they are much more healthy and vigorous than those who make use of meat. Some of these reformers are laboring men, who are compelled to work hard from the rising to the setting of the sun, and they assure me they possess a greater amount of physical strength than when in the habit of flesh-eating. Moreover, they always have a relish for their meals, without being troubled by a loss of appetite at one time, or the cravings of hunger at another. They are comparatively exempt, also, from attacks of disease, such as colds, diarrhoea, dysentery, and the prevailing maladies of the seasons; and among the whole of these reformers, I rarely or never met with a case of costiveness, or sick-headache—complaints which are so universal at the present day."* 22

[NOTE 23. Constipation is the prevailing condition of the people of this country; more especially with females: and probably the inhabitants of no country in the world use so great a proportion of concentrated and obstructing food. The maladies which spring from this source are almost legion, and the infirmities and suffering are absolutely appalling. Yet our doctors go on from year to year, and from generation to generation, instructing the people how to destroy their bowels with physic, instead of the manner of regulating them by proper food. In the dozen years of medical practice, during which my attention has been particularly directed to this subject, I have never known a consistent vegetarian to be troubled with costive bowels, sick headache, dysentery, nor piles; nor a well-fed child of vegetarian parents to be afflicted with dysentery, nor cholera infantum. T.]

248. It would be easy to cite many more medical authorities, to show that a fruit and farinaceous diet is not inconsistent with perfect health; but this is unnecessary. I shall therefore endeavor to confirm the opinions already given, by a few practical examples.

249. "The natives of Sierra Leone, whose climate is said to be the worst on earth, are very temperate; they subsist entirely on small quantities of boiled rice, with occasional supplies of fruit, and drink only cold

* American Vegetable Practice, by Morris Mattson, Physician to the Reformed Boston Dispensary, &c.

water : in consequence, they are strong and healthy, and live as long as men in the most propitious climates.”*

250. Dr. W. Stark mentions, that Mr. Slingsby lived many years on bread, milk, and vegetables, without animal food or wine ; and that since he observed this regimen, he was very vigorous, enjoyed good health and spirits, and remained free from gout ; and that Dr. Knight lived long on diet strictly vegetable, excepting eggs, milk, (with tea and chocolate,) and butter ;—taking however a little wine ; and that, living in this manner, he had been free from attacks of gout.

251. Dr. Combe mentions a remarkable case of improvement in the health of children, by attention to the physiological laws. It is that of the Orphan Asylum in Albany, (New York,) which was opened towards the end of 1829, with about seventy children ;—the number being subsequently increased to eighty. “ During the first three years,” says he, “ when an imperfect mode of management was in operation, from four to six children were constantly on the sick-list, and sometimes more ; one or two assistant-nurses were necessary ; the physician was in regular attendance twice or thrice a week ; and the deaths amounted (in all) to between thirty and forty, or about one in every month. At the end of this time, an improved system of diet and general management was adopted ; and, notwithstanding the disadvantages inseparable from the orphan state of the children, the results were in the highest degree satisfactory. The nursery was soon entirely vacated, and the services of the nurse and physician no longer needed ; and, for more than two years, no case of sickness or death took place. It is also stated that, since the new regimen has been fully adopted, there has been a remarkable increase of health, strength, activity, vivacity, cheerfulness, and contentment among the children. The change of temper is also very great : they have become less turbulent, irritable, peevish, and discontented ; and far more manageable, gentle, peaceable, and kind to each other.” It is surprising that neither Dr. Combe nor Dr. Carpenter (who also quotes the case) informs us in what this change of diet consisted ; namely, a complete exclusion of all animal food, and strict adherence to vegetable regimen ; with certain other salutary regulations as to ventilation, sleeping-rooms, &c.

252. Dr. Lambe, who has (in two or three works) strenuously and excellently vindicated the cause of vegetable diet ; Mr. Newton, who also has written upon the subject ; Sir Richard Phillips, and many others in this country, might be mentioned, as enjoying good health for many years, without tasting any kind of animal food ; but as most of the cases to be

* Monthly Magazine, July, 1815, p. 528.

adduced by way of illustration will range more appropriately under some of the succeeding heads, the examples already given may suffice.

CHAPTER IV.

VEGETABLE FOOD CONSISTENT WITH PHYSICAL STRENGTH AND ACTIVITY.

253. THOUGH it is generally admitted by medical professors who have considered the subject, that vegetable food is quite sufficient for the maintenance of health, yet there is a very prevalent opinion (in this country, at least) that it is insufficient for imparting to the human frame that degree of muscular power and energy which is in strict harmony with the due development of other parts of the system. If brute force, exerted for short periods of time—without any regard to intellectual culture, moral feeling, human sympathy, domestic happiness, or longevity—be considered the perfection of human existence, then is a diet of flesh-meat entitled to our preference: but if the normal development of the physical, mental, and moral powers of man—the production of the purest enjoyment and greatest happiness for the longest period—be the objects of our choice, then shall we find a well-selected vegetable diet much superior to either an animal or mixed one, for accomplishing our purpose.

254. The flesh of animals and fermented liquors, being much more stimulative than fruit and farinaceous vegetable substances, appear to impart considerably more strength and vigor to the muscular system than the latter; and doubtless, while the stimulation lasts, a person is capable of much greater exertion under it; but the only sure way of permanently increasing the powers of the muscular system, is by a natural and nutritious diet, along with judicious exercise. The mode in which stimulants act, is by exciting the nervous energy, and quickening the circulation, and thus producing rapid transformations of the tissues throughout the whole structure; and while these changes are taking place—whether as the effect of animal food, fermented liquors, anger, madness, fever, or exercise—the muscular power is (for the time) increased; but exhaustion constantly succeeds, and will invariably be in proportion to the degree and duration of their action. Exercise, however, is the only safe and legitimate stimulant, in a normal state of the system; for it creates a healthy demand for

renewal, by promoting the requisite decomposition of structure ; while the others destroy the balance between decay and reproduction, and thus lay the foundation of local or general disease.²⁵

[NOTE 25.—Those effects which are called *stimulant*, *tonic*, &c., are in reality the evidences of the *resistance* which the vital powers make to the injurious or impure substance, and not, as is commonly supposed, the action of the article on the system. The *feeling of strength* is increased, for the reason that the energies of the system are roused into unnatural intensity of action to defend the vital machinery ; and the reason that a depression of power is always experienced afterwards, is because the vital energy has been expended, uselessly wasted, in the struggle. T.]

255. "But whatever may be the real character of the stimulus, every stimulation to which the system is accustomed increases, according to the power and extent of its influence, what is called '*the tone*,' and the action of the parts on which it is exerted ; and, while the stimulation lasts, it always increases the feeling of strength and vigor in the system—whether any nourishment be imparted to the system or not. Yet, by so much as the stimulation exceeds, in degree, that which is necessary for the full and healthy performance of the function or functions of the organs stimulated, by so much the more does the expenditure of vital power and waste of organized substance exceed, for the time, the replenishing and renovating economy of the system ; and, consequently, the exhaustion and indirect debility which succeed the stimulation are always necessarily commensurate with the excess. Hence, though that food which contains the greatest proportion of stimulating power to its quantity of nourishment, causes, while its stimulation continues, a *feeling* of the greatest strength and vigor, it also necessarily produces the greatest exhaustion in the end ; which is commensurately importunate and vehement in its demands for relief, by the repetition of the accustomed stimulus ; and, as the same food more readily than any other affords the demanded relief, by supplying the requisite degree of stimulation, our feelings always lead us to believe that it is really the most strengthening. Hence, whenever a *less* stimulating diet is substituted for a more stimulating one, a corresponding physiological depression, or want of tone and action, always necessarily succeeds—varying in degree and duration, according to the general condition of the system, and the suddenness and greatness of the change ; and this depression is always attended by a feeling of weakness and lassitude ; which is immediately removed, and the feeling of strength and vigor restored, by the accustomed

degree of stimulation, by whatever produced—whether any increase of nourishment is actually afforded to the system or not. The feeling of *strength* produced by stimulation, therefore, is no proof that the stimulating substance is either nourishing or salutary, nor even that it is not decidedly baneful.” * Yet how many are deceived by the temporary sensation thus produced!

256. “Dulong found that the quantity of oxygen lost during respiration, and not replaced by carbonic acid, amounted, (on an average,) in the case of herbivorous animals, to one-tenth of the volume of that which was replaced by carbonic acid; in the case of carnivorous animals, it amounted to from one-fifth to one-half.” † It was also ascertained by the experiments of Dr. Fife, and confirmed by the observations of Mr. Spalding, in his own person, that in the same individual, while animal food is taken, a larger quantity of air is required for respiration, and a greater proportion of oxygen is consumed, than when vegetable aliment is employed. It may be inferred, also, that the greater the quantity of animal food eaten, the greater is the quantity of oxygen consumed by the lungs in a given time. The respirations, also, are more frequent in a given time, when the individual subsists on animal food, than when he lives on vegetable aliment. “These facts show,” says Dr. Craigie, ‡ “that the sustenance of the frame by means of animal diet causes a more violent and laborious action of the lungs than the sustenance of the same frame by means of vegetable diet. Hence, persons living on animal food breathe laboriously, and are less capable of fatigue.” These facts have been sufficiently explained, (200;) and it has been shown that, under a farinaceous diet, a considerable amount of oxygen is separated from the food, whereby a less amount of atmospheric air for respiration becomes necessary. Hence, also, the advantage of vegetable food in cases of phthisis, because it is of a milder and less stimulating nature than an animal or mixed diet; and the lungs have much less labor to perform. (362.)

257. The processes of assimilation and nutrition, also, on a flesh diet, are more rapid, and attended with a greater expenditure of vital power and waste of organized substance, than in the use of pure vegetable aliment: hence those who subsist principally on the former suffer much more distress from hunger, when deprived of their accustomed meals, than they do who subsist on the latter. This is one important reason why—all other things being equal, and the system being fully established in its habits—

* Graham's Lectures, vol. ii. p. 96.

† Müller's Elements of Physiology, vol. i. p. 826.

‡ Elements of the Practice of Physic, vol. ii. p. 648.

they who subsist on a well-chosen vegetable diet can endure protracted labor, fatigue, and exposure, without food, much longer than they who subsist mostly or entirely on flesh-meat. For as the transformation of the tissues takes place more slowly on the former diet, and as the true sensation of hunger depends upon the general wants of the system rather than upon the emptiness of the stomach, the appetite for food does not recur so frequently on well-chosen vegetable aliments; nor is the craving for food so acute as upon a more stimulating diet. The more stimulating the food, the sooner does the demand for it return.²⁶

[NOTE 26. I have often noticed, in conducting a Water-Cure establishment, containing more than a hundred inmates on the average, about half of whom were either vegetarians in principle, or were restricted to an exclusively vegetable diet by special prescription, that such patients can bear fasting for a time much better than the flesh-eaters; and they suffer but little, in comparison with those who employ a mixed diet, from the "craving" sensation at the stomach, on the approach of the dinner or supper hour. To this rule I have never known one exception. T.]

258. That even grass and other herbaceous substances are quite adequate to produce great physical force and vigor, when the alimentary organs are in direct relation to the food to be assimilated, we may learn from the horse, the elephant, the rhinoceros, and many other herbivorous animals, whose great muscular power is well known; and that fruits, roots, and grain are also competent to supply considerable muscular energy, is sufficiently evinced by the orang-outang. "Allemand, the Dutch professor of Natural History, had received many vague and unsatisfactory accounts respecting an animal of this kind, and was induced to write to Mr. May, a captain in the Dutch naval service, stationed at Surinam. This gentleman found him exactly similar to one which he had brought from Guinea, except in size. He was nearly five feet and a half high, and very strong and powerful. Mr. May had seen him take up his master (a stout man) by the middle, and fling him from him for a pace or two; and one day he seized a soldier, who happened to pass carelessly near the tree to which he was chained, and, if his master had not been present, he would actually have carried the man into the tree."* Dr. Abel gives an interesting account of the cruel capture of one of the red or Asiatic oranges; and informs us that, after receiving five balls, and vomiting a considerable quantity of blood, and when nearly in a dying state, he seized a spear

* Sir W. Jardine's Naturalist's Library, "Mammalia," vol. i. p. 58.

made of supple wood, which would have withstood the strength of the stoutest man, and shivered it in pieces : in the words of the narrator, he broke it as if it had been a carrot. It is stated by those who aided in his death, that the human-like expression of his countenance, and piteous manner of placing his hands over his wounds, distressed their feelings, and almost made them question the nature of the act they were committing.*

259. But we are not dependent upon illustrations from the inferior races of animals, to prove that vegetable food is not inconsistent with muscular strength and vigor ; for ancient and modern history abounds with striking demonstrations of the fact ; and innumerable well-known instances at the present day, and to which reference will shortly be made, ought to convince the most sceptical. We have already seen that the antediluvians enjoyed good health and strength, and lived to advanced periods of time, on vegetable diet ; and, since the Flood, we have many examples to the same effect. " Cyrus, who raised Persia from an obscure, rude colony, to one of the most powerful and splendid empires that the world ever saw ; who performed more extraordinary marches, fought more battles, won more extraordinary victories, and exhibited more personal prowess and bodily power of effort and endurance than almost any other general that ever lived, subsisted, from childhood, on the simplest and plainest diet of vegetable food and water ; and the Persian soldiers who went with him through all his career of conquest, and shared with him all his hardships, toils, and dangers, and on whom he always placed his main dependence in battle, and with whom he was able to march thousands of miles in an incredibly short time, and conquer armies of double the number of his own, were, like himself trained from childhood on bread, cresses, and water ; and strictly adhered to the same simplicity of vegetable diet, throughout the whole of their heroic course, without relaxing from the stern severity of their abstemiousness even in the hour of victory, when the luxuries of captured cities lay in profusion around them." The Persians of the present day are very abstemious, and use little animal food. Pilau, or rice stewed with various ingredients, forms their favorite dish. The chief luxury of their table consists in a profusion of the best of fruits ; yet is the physical character of the Persians said to be fine, both as to strength and beauty.

260. In the most heroic days of the Grecian army, their food was the plain and simple produce of the soil. The immortal Spartans of Thermopylæ were, from infancy, nourished by the plainest and coarsest vegetable aliment ; and the Roman army, in the period of their greatest valor and most gigantic achievements, subsisted on plain and coarse vegetable

* *Ibid.*, p. 85.

food. When the public games of ancient Greece—for the exercise of muscular power and activity in wrestling, boxing, running, &c.—were first instituted, the *athletæ*, in accordance with the common dietetic habits of the people, were trained entirely on vegetable food. “Those who were destined to this profession frequented, from their tender age, the *Gymnasia* or *Palestræ*, which were a kind of academies maintained for that purpose at the public expense. In these places, such young people were under the direction of different masters, who employed the most effectual methods to inure their bodies for the fatigues of the public games, and to form them for the combats. The regimen they were under was very hard and severe. At first, they had no other nourishment but dried figs, nuts, soft cheese, and a gross, heavy sort of bread called ‘*μαζα*.’ They were absolutely forbidden to use wine, and required to observe the strictest continence.”* “In later times—after animal food had begun to be common among the people, and flesh-meat was found to be more stimulating, and to render their pugilists and gladiators more ferocious—a portion of flesh was introduced into the diet of the *Athletæ*. But, according to the testimony of early Greek writers, it was soon found that the free use of this kind of aliment made them the most sluggish and stupid of men.”†

261. “It is said, that after the Romans became a flesh-eating people, the Roman army was equally heroic and victorious; but it should be remembered that, whatever were the practices of the wealthy and luxurious Roman citizen, flesh-meat entered but very sparingly into the diet of the Roman soldier till after the days of Roman valor had begun to pass away; and, with equal pace, as the army became less simple and less temperate in their diet, they became less brave and less successful in arms. It should be remembered, also, that after the Romans had become a flesh-eating people, the success of the Roman army did not, as at first, depend on the bodily strength and personal prowess of individual soldiers, but on the aggregate power of well-disciplined legions, and on their skill in systematic war. So far as bodily strength and ability to endure voluntary action are considered, the Roman soldier was far the most powerful and heroic in Rome’s earliest days, when he subsisted on his simple vegetable food.‡

262. The same important principles are demonstrated by the facts of modern times. “Very few nations in the world,” says a sagacious historian, “produce better soldiers than the Russians. They will endure the greatest fatigues and sufferings with patience and calmness;” and it is well known that the Russian soldiers are, from childhood, nourished by simple

* Rollin’s *Ancient History*, vol. 1.

† *Athletæ*, Introduction.

‡ *Graham’s Lectures*, vol. II. p. 188.

and coarse vegetable food. "The Russian grenadiers," says a letter from the Helder, "are the finest body of men I ever saw: not a man is under six feet high. Their allowance consists of eight pounds of black bread, four pounds of oil, and one pound of salt, per man, for eight days; and, were you to see them, you would be convinced that they look as well as if they lived on roast beef and English porter."* "The Russian peasant," observes Bremner in his "Excursions in the Interior of Russia," "is satisfied with the plainest food. No people in Europe are so coarsely fed. Their diet consists of the most acrid articles that were ever devised: pickled cucumbers, pickled cabbages, or pickled mushrooms, with a piece of black bread, are their daily fare." Again he says: "Unless in the very largest towns, butcher's-meat would appear to be very little used. Even in such places as Toulá and Zaráisk a butcher's-shop is never seen; a calf with the skin half off is sometimes displayed at a butcher's door; but the sight does not occur above once in two hundred miles. Fish is even more rare than beef, being always sold alive from the river; none is ever exposed in the market-places. Vegetables and milk compose a great part of the diet in the districts we have now reached."

263. "I have made several voyages to St. Petersburg, in Russia," says Capt. Cornelius S. Howland, of New Bedford, Mass. "The people of Russia generally subsist, for the most part, on coarse, black rye-bread and garlicks. The bread is exceedingly coarse, sometimes containing almost whole grains; and it is very hard and dry. I have often hired men to labor for me in Russia; which they would do from sixteen to eighteen hours and 'find themselves,' for eight cents per day, the sun shining there—sometimes twenty hours in the day. They would come on board in the morning, with a piece of their black bread weighing about one pound, and a bunch of garlicks as big as one's fist. This was all their nourishment for the day of sixteen or eighteen hours' labor. They were astonishingly powerful and active; and endured severe and protracted labor far beyond any of my men. Some of these men were eighty and even ninety years old; and yet these old men would do more work than any of the middle-aged men belonging to my ship. In handling and stowing away iron, and in stowing away hemp with the jack-screw, they exhibited most astonishing power. They were full of agility, vivacity, and even hilarity; singing as they labored with all the buoyancy and blithesomeness of youth."

264. The general food of the Norwegians is rye-bread, milk, and cheese. Mr. Twining says: "As a particular luxury, the peasants eat their *sharks*, which are thin slices of meat, sprinkled with salt, and dried in the wind,

* The "Sun" newspaper for September 25, 1788.

like hung-beef; but this indulgence in animal food is very rare indeed. A common treat, on high days and holy days, consists of a thick hasty-pudding, or porridge of oat-meal or rye-meal; seasoned by two or three pickled herrings, or salted mackerel. All the travellers I have consulted, agree in representing the people as thriving on this apparently poor fare; and in no part of the world, in proportion to its population, are there more instances of extreme longevity than in Norway." "Notwithstanding the poor fare of the inhabitants," says Dr. Capell Brooke, "they are remarkably robust and healthy. Though in many parts animal food is quite unknown to them, they are generally tall and good-looking, with a manly openness of manner and countenance, which increased the farther north I proceeded. From this hardy way of living, and being daily accustomed to climb the mountains, they may be said to be in a constant state of training; and their activity, in consequence, is so great, that they keep up with ease by the side of your carriage at full speed, for the distance of ten or twelve miles."

265. "The Polish and Hungarian peasants from the Carpathian Mountains," says a young Polish nobleman, "are among the most active and powerful men in the world: they live almost entirely on oat-meal bread and potatoes. The Polish soldiers under Bonaparte," continues he, "would march forty miles in a day, and fight a pitched battle; and the next morning be fresh and vigorous for further duties." The peasants of some parts of Switzerland, who hardly ever taste any thing but bread, cheese, and butter, are vigorous people. "The Bernese," observes M. Raspail, "so active and so strongly formed, live scarcely on any thing but maize and fresh water." Those who have penetrated into Spain, have probably witnessed to what a distance a Spanish attendant will accompany on foot a traveller's mule or carriage; not less than forty or fifty miles a day; raw onions and bread being his only fare.

266. "With respect to the Moorish porters in Spain," says Capt. C. F. Chase, of Providence, R. I., "I have witnessed the exceedingly large loads they are in the habit of carrying; and have been struck with astonishment at their muscular powers. Others of the laboring class, particularly those who are in the habit of working on board of ships, and called in that country 'stevedores,' are also very powerful men. I have seen two of these men stow off a full cargo of brandy and wine in casks, after it was hoisted on board and lowered into the hold, apparently with as much ease as two American sailors would stow away a cargo of beef and pork. They brought their food on board with them, which consisted of coarse, brown wheat-bread and grapes."

267. "The Greek boatmen," says the venerable Judge Woodruff, of Connecticut, who went out as the agent of the New York Committee for the relief of the Greeks, "are seen in great numbers about the harbors, seeking employment with their boats. They are exceedingly abstemious. Their food always consists of a small quantity of black bread, made of unbolted rye or wheat-meal, generally rye; and a bunch of grapes or raisins, or some figs. They are, nevertheless, astonishingly athletic and powerful; and the most nimble, active, graceful, cheerful, and even merry people in the world. At all hours they are singing; blithesome, jovial, and full of hilarity. The laborers in the ship-yards live in the same simple and abstemious manner, and are equally vigorous, active, and cheerful. They breakfast and dine on a small quantity of their coarse bread, and figs, grapes, or raisins. Their supper, if they take any, is still lighter; though they more frequently take no supper, and eat nothing from dinner to breakfast. It is, indeed, astonishing to an American, to see on how small a quantity of food these people subsist. It is my serious opinion, that one hearty man in New England ordinarily consumes as much food in a day as a family of six Greeks. Yet there are no people in the world more athletic, active, supple, graceful, and cheerful. In Smyrna, where there are no carts or wheel-carriages, the carrying business falls upon the shoulders of the porters, who are seen in great numbers about the wharves and docks, and in the streets near the water-side, where they are employed in lading and unlading vessels. They are stout, robust men, of great muscular strength; and carry at one load, upon a pad fitted to their backs, from four hundred to eight hundred pounds. Mr. Langdon, an American merchant residing there, pointed me to one of them in his service, and assured me that, a short time before, he carried at one load, from his warehouse to the wharf, about twenty-five rods, a box of sugar weighing four hundred pounds, and two sacks of coffee weighing each two hundred pounds—making, in all, eight hundred pounds: that, after walking off a few rods with a quick step, he stopped and requested that another sack of coffee might be added to his load; but Mr. Langdon, apprehending danger from so great an exertion, refused his request." Lieut. Amasa Paine informs us, that one of these porters carried a load weighing nine hundred and sixty pounds. Mr. Luther Jewett, of Portland, Maine, says, that one of his schooners came into Portland, laden with barilla, from the Canary Islands; and that he stood by while the schooner was discharging its cargo, and saw four stout American laborers attempt, in vain, to lift one of the masses of barilla, which the captain and mate both solemnly affirmed was brought from the storehouse to the vessel by a single man—a native laborer where they freighted; and he subsisted entirely on coarse vegetable food and fruit.

· 268. Mr. W. Fairbairn, of Manchester, in the "Report on the Sanitary Condition of the Laboring Population of Great Britain," says: "I observed, on a late journey to Constantinople, that the boatmen or rowers of the *caïques*, who are perhaps the first rowers in the world, drink nothing but water; and they drink that profusely during the hot months of the summer. The boatmen and water-carriers of Constantinople are decidedly, in my opinion, the finest men in Europe, as regards their physical development; and they are all water-drinkers: they may take a little sherbet; but, in other respects, are what we should call in this country 'Teetotallers.' Their diet is chiefly bread; now and then a cucumber, with cherries, figs, dates, mulberries, or other fruits which are abundant there; now and then a little fish: occasionally, I believe, they eat the flesh of goats; but I never saw them eating any other than the diet I have described. They eat about the same amount as European workmen; but, if any thing, are more moderate as respects quantity."

269. Mr. Buckingham informs us that the inhabitants of the mountains of Himalayah, although fed upon nothing but rice, are yet much superior to our sailors in strength. The Japanese not only abstain from animal food, but even from milk and its productions. One of the laws which they most religiously observe is, not to kill nor to eat any thing that is killed. Their chief food consists of rice, pulse, fruits, roots, and herbs, but mostly rice, which they have in great plenty and perfection; and dress in so many different ways, and give to it such variety of tastes, flavor, and color, that a stranger would hardly know what he was eating.* Hot rice-cakes are the standard food; and are kept ready at all the inns, to be presented to the traveller the moment he arrives, along with tea, and occasionally sacki or rice-beer. The Japanese are, however, represented as robust, well-made, and active, remarkably healthy, long-lived, and intelligent. "I see," says Michaelis, "from Russel's Natural History of Aleppo, (page 50,) that there the Jews and Turks never taste the flesh of cattle."

270. The Hindoos are divided into several distinct orders or classes; which division has existed from the remotest times. "The three higher classes are, by their religion, prohibited entirely the use of flesh-meat; the fourth is allowed to eat all kinds except beef; but only the lowest classes are allowed every kind of food without restriction; and it is in these lowest classes that the most miserable, ill-formed, and indolent portion of the native inhabitants of India are found: while among the higher and more intelligent, temperate, and virtuous classes, which subsist on a pure and wholesome vegetable aliment, men of six feet stature, and with well-

* "Mod. Univer. Hist.," vol. ix. p. 62.

proportioned, symmetrical, vigorous, and active bodies, are by no means uncommon ; and for natural ease, grace and urbanity, this class of Asiatics are exceeded by no people in the world." *

271. "There is a caste of Hindoos," says Sir John Sinclair, "called, on the western side of India, Pattamars, whose sole occupation is to carry letters and despatches by land ; and they perform journeys almost incredible in the time allotted, as is the small quantity of food they subsist on during their journey. They generally go in pairs, for fear of one's being taken ill, and are allowed rewards in proportion to the expedition with which they perform their journey. From Calcutta to Bombay, I think, twenty-five days are allowed, (about sixty-two miles a day ;) from Madras to Bombay, eighteen days ; from Surat to Bombay, three days and a half. They are generally tall, being from five feet ten inches to six feet high. They subsist on a little boiled rice."

272. The Chinese also feed almost entirely on rice, confections, and fruits ; and although many of them—from chewing opium, and other pernicious habits, as well as from extreme scarcity of food—are in a state of great wretchedness, yet those who are enabled to live well, and spend a temperate life, are possessed of great strength and agility. "A finer shaped and more powerful race of men exists nowhere," says Sir John Davis, the present Governor of Hong Kong, "than the coolies or porters of Canton ; and the weight they carry with ease, on a bamboo between two of them, would break down most others. The freedom of their dress gives a development to their limbs that renders many of the Chinese models for the sculptor." Gutzlaff says that, on a certain occasion, "not being able to walk, we procured sedan-chairs. The bearers appeared to be the lowest of the low—clad in a few rags, and looking as emaciated as if they were going to fall down dead. But under this unseemly exterior they hid great strength. I certainly believe that a well-fed horse would not have been able to carry some of us, who were stout and hale, over the cragged mountains, without sinking under the load. But these men walk on briskly and sure-footed, and ascend acclivities with greater speed than we could have done in walking. Yet, though these men were meagre, and hungry as wolves, they were cheerful and boisterous. Of the scanty livelihood upon which the poorer classes, and indeed nine-tenths of the nation, are obliged to subsist, those who have not witnessed the reality can hardly have an adequate idea. The wages are so low that a man who has worked hard from morning till evening receives perhaps ten cents, and with this he has to maintain wife and children."

* Graham's Lectures, vol. II, p. 198,

273. In Egypt, the diet of the peasantry and laboring people is much the same as in China. They use some animal substance, particularly fish, as a kind of relish or condiment, but their nourishment is derived from vegetable substances. Their food chiefly consists of coarse bread, made of wheat, of millet, or maize, together with cucumbers, melons, gourds, onions, leeks, beans, chickpease, lupins, lentils, dates, &c. Most of these vegetables they eat in a crude state. "It is indeed surprising to observe how simple and poor is the diet of the Egyptian peasantry, and yet how robust and healthy most of them are, and how severe is the labor which they can undergo. The boatmen of the Nile are mostly strong, muscular men. They undergo severe labor in rowing, poling, and towing; but are very cheerful, and often the most so when most occupied, for then they frequently amuse themselves by singing." * "The Egyptian cultivators of the soil, who live on coarse wheaten bread, Indian bread, lentils, and other productions of the vegetable kingdom," says Mr. Catherwood, "are among the finest people I have ever seen."

274. The natives of Central Africa, who subsist wholly on vegetable food, possess astonishing bodily powers. "The people of Jenna," say the enterprising Landers, "have abundance of bullocks, pigs, goats, sheep, and poultry; but they prefer vegetable food to animal. Their diet, indeed, is what we should term poor and watery, consisting chiefly of preparations of the yam, and of Indian corn; notwithstanding which, a stronger or more athletic race of people is nowhere to be met with. Burdens with them are invariably carried upon the head; and it not unfrequently requires the united strength of three men to lift a calabash of goods from the ground to the shoulders of one; and then, and not till then, does the amazing strength of the African appear. Some of the women that we saw bore burdens on their heads that would tire a mule; and children not more than five or six years old trudged after them with loads that would give a full-grown person in Europe a brain-fever."

275. "The Kroomen are a particular race of people, differing entirely from the other African tribes. They inhabit a country called 'Settra Kroo,' on the coast near Cape Palmas. Their principal employment is of a maritime nature. A certain number of these men are always employed on board of the ships of war, on the African coast, for the purpose of performing those duties in which considerable fatigue and exposure to the sun are experienced. They only require a little palm oil and a few yams to eat, and they are always ready to perform any laborious work which may be required of them."†

* Lane's "Egypt."

† Graham's Lectures, vol. II., p. 205.

276. "The principal article of food among the Indians of Mexico, and more particularly in the state of Tobasco," says Mr. Pope, who resided several years among them, "is Indian corn. It consequently constitutes the most important article of agriculture; and three crops may be obtained in a year, without the labor of tillage. From the corn they prepare a thin cake, called the 'fortilla,' which is a bread universally used by the better class of the inhabitants, and a dough from which is made what they call 'posol:' the latter article is prepared by boiling the corn, and afterwards crushing it on a flat stone fitted for the purpose, and which every family possesses; it being substituted for grinding, as corn-mills are unknown in the country. This dough is laid aside until wanted for use, and in a short time becomes sour; in which condition it is generally preferred. It is then mixed with water, to such a consistency as may be drunk; and sometimes a little sugar is added. On this food alone they are enabled to subsist and undergo far more fatigue, under the tropical sun of Mexico, than our northern laborers in the northern latitudes, with the free use of animal food. I have not unfrequently been forty hours in ascending the Tobasco river to the capital, a distance of about seventy-five miles, in one of their canoes, against a current of from three to four miles an hour; the man poling the canoe (a very laborious employment) sixteen hours out of the twenty-four. Those who abstain from the use of ardent spirits are muscular and strong; and among them are to be found models for the sculptor."

277. Sir Francis Head informs us, that immense loads are carried by the South American miners, though fed entirely on grain and pulse. "It is usual for the copper-miners of Central Chili to carry loads of ore of 200 lbs. weight up eighty perpendicular yards twelve times a day. When they reach the mouth of the pit they are in a state of apparent fearful exhaustion, covered with perspiration, their chests heaving, yet after briefly resting they descend again. Their diet is entirely vegetable: breakfast consists of sixteen figs and two small loaves of bread; dinner, boiled beans; supper, roasted wheat grain. They scarcely ever taste meat; yet on this simple diet they perform a labor that would almost kill many men." The diet of the Affghan consists of bread, curdled milk, and water. He lives in a climate which often produces in one day extreme heat and cold; he will undergo as much fatigue, and exert as much strength, as the porters of London, who are fed on flesh and ale; neither is he subject to their acute and obstinate disorders."*

278. "The Spaniards of Rio Salada, in South America,—who come down from the interior, and are employed in transporting goods overland,

* Dr. Dick's *Miscellanea Medica*.

—live wholly on vegetable food. They are large, very robust, and strong; and bear prodigious burdens on their backs—such as require three or four men to place upon them—in knapsacks made of green hides: and these enormous burdens they will carry fifty miles into the country; travelling over mountains too steep for loaded mules to ascend, and with a speed which few of the generality of men can equal without any encumbrance.”

279. “The slaves of Brazil are a very strong and robust class of men, and of temperate habits. Their food consists of rice, fruits, and bread of coarse flour, and from the farrenia root. They endure great hardships, and carry enormous burdens on their heads a distance of from a quarter of a mile to a mile, without resting. It is a common thing to see them in droves or companies, moving on at a brisk trot, stimulated by the sound of a bell in the hands of the leader; and each man bearing upon his head a bag of coffee weighing a hundred and eighty pounds, apparently as if it were a light burden. They also carry barrels of flour, and even barrels of beef and pork, upon their heads. They are seldom known to have a fever, or any other sickness. The Congo slaves of Rio Janeiro subsist on vegetable food, and are among the finest-looking men in the world. They are six feet high, every way well proportioned, and remarkably athletic. The laborers of Laguayra eat no flesh, and are an uncommonly healthy and hardy race. A single man will take a barrel of beef or pork on his shoulders, and walk with it from the landing to the custom-house, which is situated upon the top of a hill, the ascent of which is too steep for carriages. Their soldiers, likewise, subsist on vegetable food, and are remarkably fine-looking men.”*

280. An officer of a frigate who had been at the Sandwich Islands has declared, that our sailors stood no chance in boxing with the natives, who fight precisely in the English manner. A quartermaster, a very stout man, and a skilful boxer, indignant at seeing his companions knocked about with so little ceremony, determined to try a round or two with one of the stoutest of the natives, although strongly dissuaded from the attempt by his officers. The blood of the native islander being warmed by the opposition of a few minutes, he broke through all the guards of his antagonist, seized him by the thigh and shoulder, threw him up, and held him with extended arms over his head for a minute, in token of triumph, and then dashed him on the deck with such violence as to fracture his skull. The gentleman added, that he never saw men apparently possessed of such muscular strength. Our stoutest sailors appeared mere shrimps compared with them. Their mode of life, constantly in vigorous action in the open air, and undebili

* Graham's Lectures, vol. II., p. 207.

tated by the use of stimulating food or drink, may be considered as a perpetual state of training.*

281. In 1823, General Valdez, a Peruvian general, led his army from near Lima to the southward of Arequipa,—a distance of two hundred and fifty leagues, or seven hundred and fifty miles,—in eleven days; or more than sixty-eight miles a day, for eleven days in succession; and, at the close of this forced march, met and routed the patriot army, which was much larger than his own. During this march, the soldiers subsisted on the parched corn which they took in their pockets. "These Peruvians," says a highly intelligent gentleman, who has spent twenty years among them, "are a more hardy race, and will endure more fatigue and privation than any other people in the world. They subsist wholly on vegetable food; and, being very improvident, their diet is generally coarse and scanty. Parched corn is their principal, and generally their exclusive article of food, when engaged in any particular enterprise or effort which requires great activity and power of body: at other times, they subsist on such of the various products of their climate as they happen to have at hand. In travelling, and in many other respects, the women are quite equal to the men in muscular power and agility."

282. Examples might be multiplied, from all parts of the world, of people living entirely upon vegetable food, and enjoying perfect health and bodily vigor; but perhaps none are more striking than those we have in close proximity to us. "The chairmen, porters, and coalheavers, the strongest men in the British dominions, are said to be, the greater part of them, from the lowest rank of people in Ireland, which are generally fed with the potato. No food can afford a more decisive proof of its nourishing quality, or of its being peculiarly suitable to the health of the human constitution."† This remark has been amply confirmed by the recent experiments of Professor Forbes on the weight, height, and strength of above eight hundred individuals; his tables clearly showing that the Irish are more developed than the Scotch at a given age, and the English less. The Rev. Howard Malcolm, of Boston,—who has travelled extensively in Europe, Asia, and America,—says: "The finest specimens of the human body I ever beheld, I saw in Ireland; and they had never tasted animal food." Many English farmers, who have been in the habit of employing the natives of the Emerald Isle, bear testimony to the fact, that those who are steady, and refrain from spirituous liquors, are indefatigable; and are capable of performing a much greater amount of agricultural labor, on

* Sir John Sinclair's Code of Health and Longevity.

† Smith's Wealth of Nations, vol. 1, p. 222.

their simple meal of potatoes and buttermilk, than the English laborer, though feeding on abundance of flesh-meat.

283. The miners in Cornwall are remarkably strong, well made, and laborious: their chief food is potatoes. Douglass, in his description of the East Coast of Scotland, says—"The common food of the country people on the east coast of Scotland is oatmeal, milk, and vegetables; chiefly red cabbage in the winter season, and cole worts for the summer and spring." At ten or twelve miles' distance from a town, flesh is never seen in the houses of the common farmers, except at a baptism, a wedding, Christmas, or Shrovetide. Yet they are "strong and active, sleep sound, and live to a good old age." He gives "a farmer's bill of fare for a day;" which is curious, and does not contain a particle of animal food. "The usual diet of laborers, in the parish of South Taunton, Devonshire, is milk and potatoes, barley or wheaten bread, and occasionally a little bacon." "Bread and cheese, potatoes and milk porridge, and a thick flummery, made of coarse oatmeal, are the usual diet of the laboring people in Pembrokeshire."*

284. Mr. Brindley, a celebrated canal engineer in this country, informs us, that in the various works in which he has been engaged—where the workmen, being paid by the piece, each exerted himself to earn as much as possible—men from the north of Lancashire and Yorkshire, who adhered to their customary diet of oat-cake and hasty-pudding, with water for their drink, sustained more labor and made greater wages than those who lived on bread, cheese, bacon, and beer—the general diet of laborers in the South. I am aware that statements have been made which seem to contradict what Mr. Brindley here affirms to be true. It has been said that Frenchmen, when employed in the forming of canals and railroads, have not been able to compete at all with the English, till they have begun to eat animal food and to drink beer. Perhaps the work was at first new to them; and habit, rather than food, might effect the change. It is not denied, however, that a more stimulating diet might excite them to more strenuous exertions; and as they became more accustomed to their work, they would perform it with much greater ease; and although a man on vegetable diet might not accomplish so much in a short space of time as a man living on more exciting food; it is nevertheless certain, that if their constitutional stamina be equal, the former will bear a continuance of labor much longer than the latter; and, by his steady and unremitting exertions, will in the end perform a much greater amount of work.

285. That animal food, or a mixed diet, is also sufficient to produce

* Sir F. M. Eden's State of the Poor.

great bodily strength and vigor, cannot be denied. The examples already adduced are merely for the purpose of showing that a vegetable diet is not *inconsistent* with these qualities; and abundant evidence yet remains to prove the superiority of a diet of fruit and farinaceous substances over one of animal food. But that the latter diet does not invariably produce strength and vigor, we have sufficient evidence in the inhabitants of both North and South latitudes. The Esquimaux and Fuegians, the Laplanders, Samoides, Ostiaks, Tunguses, Burats, and Kamtschatdales, though living almost exclusively on animal food, are the smallest, weakest, and least brave people of the globe. This part of the subject may be concluded with a few instances of individuals who have either never eaten animal food, or subsequently discontinued its use.

286. "The yeomanry and laboring poor, throughout the greater part of Westmoreland and Cumberland, live altogether without animal food. Even substantial *statesmen*, as they are there called, who cultivate their own land, do not see a piece of flesh-meat at their table, for weeks or months together. Their chief diet is potatoes, milk, and oat-cakes; wheaten bread being almost as great a variety as beef or mutton."*

287. Judge Woodruff, to whom I have previously alluded, (267,) relates an interesting anecdote of a Greek youth, a native of Thessaly, about nineteen years of age, who subsisted on the plainest, simplest, and coarsest vegetable food; mostly in a natural state, and chiefly fruit. "On our passage home from Greece," says he, "we encountered a number of severe gales, in which all the sailors were obliged to exert themselves to the utmost. During these times, our Greek boy, John of Thessaly, displayed the most astonishing agility and muscular power. He would run out on the rigging; and, hanging by one leg, he would handle the sails with a degree of strength which seemed almost supernatural: although the storm was severe, and the sea rough, yet he would often swing so as to describe a considerable part of a circle, and it appeared impossible for any creature to hold fast. I witnessed these exploits with painful dread, expecting every moment to see him shaken from the rigging into the ocean; but he felt perfectly secure, and even loved the sport, and seemed proud to be daring. One day, while we were sailing under a pleasant breeze, and nothing for the hands to do, the men amused themselves in performing various feats; and, among other things, they tried to lift a cannon which was lying upon the deck. We had among the crew one very large, stout-built, powerful man, a native of Kentucky, who went by the name of 'big Charlie.' He prided himself in his strength: and, after several others had tried in vain to

* *Ritson on Animal Food.*

lift the gun, he took hold, and laid out his whole strength ; but did not stir it. He changed his position ; and tried the second and the third time, with all his might ; but was not able to move the gun at all. After big Charlie had given up, and all supposed, of course, that it was entirely useless for any one else on board to try, the Greek boy, John, who had been idly looking on, came up lazily, and took hold of the gun ; and—to the utter amazement of the whole crew—he, with apparent ease, raised it up full two inches from the deck, and laid it down again. The astonished spectators could not believe their own eyes ; and, to satisfy them there was no deception about it, he raised it up the second time. This feat appeared so extraordinary to me, that I could not divest myself of the suspicion that there might be some peculiar sleight in it ; and—as I had been, in my prime, a pretty stout man—I thought I would try my own hand at it. I accordingly watched my opportunity, when no one was present to witness my attempt ; and, taking hold of the gun in the manner the Greek boy had done, I exerted all my strength ; but I could no more move it than if it had been riveted to the deck.”*

288. The celebrated Lord Heathfield, who defended the fortress of Gibraltar with such consummate skill and persevering fortitude, was well known for his hardy habits of military discipline. He neither ate animal food nor drank wine ; his constant diet being bread and vegetables, and his drink water ; and he never slept more than four hours in the twenty-four. “ My health,” says Mr. Jackson, a distinguished surgeon in the British army, “ has been tried in all ways and climates ; and, by the aids of temperance and hard work, I have worn out two armies in two wars, and probably could wear out another, before my period of old age arrives. I eat no animal food, drink no wine or malt liquors, nor spirits of any kind. I wear no flannel ; and regard neither wind nor rain, heat nor cold, when business is in the way.”

289. “ Thomas Jackson, a laboring man of Nantucket, has never eaten any flesh, though he sometimes eats fish. He informed me, a short time since,” says Mr. William Macy, “ that he had never been sick, never felt any of the aches and pains of which others complain, and never experienced any painful weariness from labor. He said he could work all day and all night, if necessary, without any considerable sense of fatigue. I have known him go into the field in the morning, and labor through the day, and come in at evening and eat his supper, and go into the oil-mill and work all night, and then go into the field again in the morning, without a moment’s sleep, and work all day ; and yet, at the close of the second

* *Graham’s Lectures*, vol. II., p. 214.

day, he assured me that he felt no oppressive sense of weariness or exhaustion. He observed to me that he had several brothers, all of whom ate flesh freely; and, said he, I am worth the whole of them to endure labor, privation, and exposure. He is uncommonly nimble and active."

290. "Thomas McGoodin, a laboring man in the Callender Factory, in Providence, is about forty years old, (February, 1834,) small frame, and weighs about 9 st. 4 lbs. From religious considerations he was induced, about 1825, to abandon the use of animal food, and adopt the most simple vegetable diet, and water to drink. After living in this way about seven years, and laboring hard, a competition arose in the beetling department of the factory, in which the ability of the laborers to endure powerful and protracted effort was severely tried. Two stations, requiring precisely the same exertion, were to be occupied for several days in succession. McGoodin took one of these stations, and occupied it through the whole time without flagging in the least; while the other station was successively occupied by three or four of the strongest men in the establishment; all of whom were actually tired out, and obliged to be relieved. The overseer of the department declared that he believed McGoodin would kill every man in the establishment, if they were obliged to hold their way with him till he gave out. McGoodin also labored from one to two hours longer than any other man."

291. Dr. Joshua Porter says: "One of my neighbors has taken no flesh for more than three years. He is of the ordinary height, and sanguine temperament, and usually weighed, when he ate flesh, 180 lbs. After he changed his diet, his countenance began to change and his cheeks fell in, and his meat-eating friends had serious apprehensions that he would survive but a short time, unless he returned to his former habits. But he persevered, and is now more vigorous and more athletic than any man in the region, or than he himself has ever been before. His muscular strength is very great. A few days since, (October 26, 1827,) a number of the most athletic young men in our village (North Brookfield) were trying their strength at lifting a cask of lime weighing 500 lbs. All failed to do it, with the exception of one, who partly raised it from the ground. After they were gone, this vegetable-eater, without any difficulty, raised the cask four or five times. He now weighs 165 lbs."

292. Dr. Lambe states that in his case there was an increase of strength, and the pulse became much more full and strong than under the use of animal food; it was also perfectly calm and regular. A correspondent of Dr. Lambe's, who had adopted the vegetable diet in his family, says: "After persisting near four years in the use of a strict vegetable diet and distilled

water, I am happy to give my decided testimony in favor of your system. Its effects have been a gradual and important strengthening of the constitution, without any inconvenience or disagreeable symptom. I found the change easy and pleasant, and have never had the least wish to resume the use of animal food. I have always used much exercise ; I have found my power of bearing fatigue increased, and have never, during the whole time, felt the slightest indisposition." Previously to this gentleman abstaining from animal food, his health had always been good ; and he gives similar testimony as to the effects of the diet upon his children—twelve, ten, and five years of age.

293. All the examples hitherto presented are of the male sex ; but instances are not wanting to show that a diet of vegetable food is equally beneficial in its influence on the health of females ; and to them, generally, it is more essential than to men. Professor Lawrence says : " I was myself acquainted with a lady who, from a kind of whim, began to live on vegetables. She was in good health, and it was not necessary at all for her to give up her ordinary habits of life. She took a fancy, however, to live in this way : she took nothing but distilled water, fruit, and vegetables ; without tasting animal substance, except the milk she took in her tea, for several years. I never knew a more active person ; she made nothing of walking ten miles, and could walk, with ease, twenty. She had two children during the time I knew her, and suckled them for about twelve months each ; during which time she only took what I have mentioned—vegetables and fruit to eat, and distilled water to drink—taking nothing stronger than tea, or tea mixed with milk ; yet they were fine healthy children."

294. At Salford, in Lancashire, there is a religious community, under the denomination of Bible Christians, who, from religious motives, abstain from animal food ; and their minister, the Rev. John Booth Strettles, has kindly answered many inquiries which I made respecting the health, &c., of the members of that society. He observes : " As to your first question, respecting the health and strength of those who adopt the vegetable diet, I have had no reason—I have neither seen nor heard of any—to doubt that in strength they are equal, if not superior, to those who live on flesh diet ; while in health, as far as my experience and observation go, they greatly excel them. During the thirty-four years which I and others with me have abstained from flesh-meat and intoxicating liquor, I have known no injury to arise from such abstinence, either to young or old." This testimony is worthy of especial notice ; as, in the society to which it refers, there must

be members of all ages, of great variety of constitution, and of all occupations.

295. Since the publication of the first edition of this work, the "Vegetarian Society" has been established, and the members held their first conference at Ramsgate, on the 30th of September, 1847, Joseph Brotherton, Esq., M. P., presiding. Although so recently constituted, the list of members published January 1, 1848, comprised as follows :

Ladies, - - - - -	110
Member of Parliament, - - - - -	1
County Magistrates, - - - - -	2
Aldermen, - - - - -	2
Physicians and Surgeons, - - - - -	9
Ministers of Religion, - - - - -	8
Authors, - - - - -	2
Professional Men, - - - - -	12
Merchants and Manufacturers, - - - - -	6
Farmers, - - - - -	3
Tradesmen, Mechanics, &c., - - - - -	123
Private Gentlemen, - - - - -	2

The following table shows their respective periods of abstinence from the flesh of animals :

Abstained upwards of 40 years, -	1
30 " -	71
20 " -	56
10 " -	44
1 " -	64
1 month, -	27

265

On the 1st of January, 1849, the number of members was 376. No less than 76 of the members have abstained from the flesh of animals the whole of their lives. The first annual meeting of the Society was held at Manchester, on the 28th July, 1848, when much interesting and practical information was elicited from the members present ; and it is to be hoped that their future records will comprise a valuable fund of statistical facts, which may be of great service to future inquirers. Mr. Thomas Taylor, who was in his sixty-first year, had abstained from animal food during thirty-five years, and observed, that he had stood more hard labor than the generality of working-men. One gentleman present, seventy-three years of age, had walked 4,941 miles within the preceding twenty-one months, besides working in his garden during his leisure hours. "The wife of another gentleman at the meeting had abstained from flesh, and all intox-

icating drinks, for thirty years, had given birth to fifteen children during that time, fourteen out of the fifteen she had suckled, and yet remained hale, young, and happy-looking." The general opinion, therefore, that physical strength cannot be maintained on a fruit and farinaceous diet, is undoubtedly wrong, and cannot have been formed from long experience, or from a proper examination of the subject. A few days' trial of a less stimulating diet than usual will certainly induce a person to suppose that it is debilitating: but if he persevere for a few months upon food judiciously selected, and take proper exercise, he will find no reason to complain of any diminution of his usual vigor.

CHAPTER V.

CLIMATE AND TEMPERATURE.

296. THE numerous references already made to men living on vegetable productions, in all climates, whether hot or cold, and engaged in all kinds of occupations, and yet enjoying health and strength, may be regarded as a sufficient refutation of the opinion that human diet should vary with the climate in which a man resides. It is true that a diet of animal food will agree much better with a person living in a cold climate, and taking a considerable amount of muscular exercise, than with one residing in a hot climate, and leading an inactive life; but it is also equally true, that a diet of fruit and farinacea is conducive to the highest and most complete development of man, physically, mentally, and morally, in cold countries as well as in hot; and, "all other things being precisely equal, the man who is fully accustomed to a pure vegetable diet can endure severer cold, or bear the same degree of cold much longer than the man who is fully accustomed to a flesh-diet. Reasoning from false notions derived from mere momentary sensation, mankind long clung to the opinion that alcoholic liquor would enable them better to endure both heat and cold; and although modern experiments are beginning to set them right concerning alcohol, yet they blindly cherish the idea that flesh-meat is better for them in cold regions than vegetable food; without pausing to consider, that while it actually affords them less real and permanent nourishment, it stimulates them more and exhausts the vital powers of their organs more rapidly; and therefore,

in all that it differs in its effects from vegetable food, it approaches more to the character of alcohol."*

297. We have seen that in Norway, Russia, and other cold portions of the globe, the people who subsist on coarse vegetable food are exceedingly hardy and vigorous; and it has been stated, by gentlemen who have spent many months in Siberia, that no exiles to that wintry region endure the severities of the climate better than those who have been all their lives accustomed to a simple vegetable diet. Not to depend exclusively on a statement of facts, let us briefly inquire how far recent discoveries in organic chemistry substantiate the view here taken.

298. It is universally admitted, that food abounding in carbon and hydrogen is absolutely necessary to the inhabitants of cold climates, in order to support animal heat; and though it is acknowledged that starch, and other amylaceous and saccharine substances, do not contain so large a proportion of these elements as animal fat and oils, yet they contain much more than the flesh or muscle of animals; and are therefore better adapted to the circumstances of a man in a cold climate, than what is generally understood by an animal or mixed diet. Many vegetables also abound in oil; as almonds, nuts, olives, chocolate, &c., which, with farinaceous substances, would sufficiently support respiration; besides, it has not yet been proved that all the animal heat is produced by the oxygenation of carbon and hydrogen.

299. It has been shown (200) that the non-azotized principles of vegetable food are easily converted into fat, by a separation of oxygen; or transformed into protein, water, and oxygen, by a union with the nitrogen of the atmosphere; or resolved, by vital chemistry, into carbonic acid and other compounds; by which processes caloric is evolved. It is clear, therefore, that upon vegetable diet the animal heat ought to be higher (*ceteris paribus*) than upon a flesh or mixed diet, from which fat and oils are excluded. But if farinaceous articles of diet cannot be procured in high latitudes, or if the persons residing there have not been accustomed to that kind of food, then undoubtedly animal oils and fat are the only substances that can be substituted for them; the flesh of lean animals being inadequate to their support, except at the expense of immense bodily exertion, to cause a sufficient waste of tissue for the purpose of supplying the carbon necessary for uniting with the oxygen of the atmosphere to produce animal heat.

300. Certain individuals, however, after adopting a vegetable diet, think that they feel more chilly and cold than when on a mixed diet; others find no alteration in this respect. The difference in the experience of various

* Graham's Lectures, vol. II., p. 278.

individuals may probably be thus explained. Vegetable food being less stimulating than the ordinary diet of this country, and less oxygen being requisite for respiration upon the former, in consequence of the liberation of that element from the food during the process of digestion, muscular activity is less required of a person adopting the former diet; and, very frequently, the habits become more sedentary under it; though this is by no means a necessary consequence. Hence the various secretions of the body are formed less rapidly; and, as caloric is developed by all chemical changes, its absolute quantity will vary with the amount of organic transformations that are constantly taking place. Many persons, also, when making this change of diet, form at the same time the salutary habit of cold sponging; and, by thus freeing the pores of the skin from feculent matter, permit a much greater amount of caloric to escape: active exercise, therefore, should invariably accompany cold ablutions, to restore the equilibrium of temperature.

301. But "the power of generating heat," as Sir John Ross* ascertained from long experience, "varies exceedingly in different individuals; and is as much a portion of the original constitution as are the muscular or the mental energies." "This at least seems certain, that men of the largest appetites and most perfect digestion produce the most heat; as feeble stomachs, whether dyspeptic, as it is termed, or merely unable to receive much food, are subject to suffer the most from cold; never generating heat enough to resist its impressions."

302. In answer to an inquiry on this subject, respecting the influence of vegetable food on the members of the religious society called "Bible Christians," the Rev. J. B. Stretches says: "I know not that any have made any change in their dress, in consequence of adopting the change of diet; nor that they have discovered any thing like a decrease of heat, arising from that change, to induce them to think it necessary."

303. In conclusion, I can with truth affirm that, after thirteen years' trial of an exclusively vegetable diet, I feel no inconvenience from the change of the seasons, though I am more thinly clad than formerly; and my present immunity from coughs and colds, to which I was very subject, may probably be attributed to the joint influence of a natural diet and daily sponging or bathing with cold water.⁷⁷

[NOTE 27. It is not yet proven that oily food, either of an animal or vegetable nature, is essential to the generation of a due supply of animal heat in cold climates. All the evidence as yet rests upon the mere

* Second Voyage in Search of a North-west Passage, p. 126

assumptions of a few chemists. But these chemists, especially Liebig and Pereira, place alcohol, as well as oil, among the "respiratory foods," because it, as well as oil, contains a large proportion of carbon. The manifest absurdity of such a conclusion is presumptive evidence against the philosophy of the theory. The truth probably is this: the ordinary farinaceous foods and fruits contain all the carbon and hydrogen requisite to sustain the animal heat in all climates and under all circumstances of temperature: and if ever surplus carbon or hydrogen is taken into the system, it is of course thrown off; and when considerable of an amount of surplus carbon and hydrogen is taken, the labor of expelling it is attended with a feverish excitement, which, instead of warming the body permanently, only wastes its energies, and renders it colder in the end. All human experience proves this to be true in relation to alcohol; and I cannot see why this explanation does not just as well apply to any substance which contains a large proportion of carbon or hydrogen, or both, with very little nutriment. T.]

CHAPTER VI.

INFLUENCE OF AZOTIZED FOOD IN THE PRODUCTION OF CERTAIN DISEASES.

Si tibi deficiant medici, medici tibi fiant

Hæc tria; mens hilaris, requies, moderata diæta.—SCHOLA SALER.

304. As health depends, primarily, upon a sound constitution, or fitness of the bodily organs to perform the functions assigned to them, and, secondarily, upon a proper relation between those organs and external objects, so disease is the consequence of organic defects, or the want of relation between external matter and the organs, or of both; so that the processes of decay and renewal are interrupted, or imperfectly performed. Functional disarrangement, therefore, affords the first indications of the commencement of disease; and although, in certain conditions of the atmosphere, the healthiest person may be subject to epidemic infection, yet were all the physiological laws of health strictly observed by persons of originally sound constitutions, they would seldom suffer from disease.

305. The principal avenues through which external agents influence organic life, for good or for ill, are the stomach, the lungs, and the skin or

general surface: the two latter require in this place no notice; our attention, therefore, will be confined to the former. It has already been shown, in part, (though the subject admits of much further elucidation,) that the teeth, salivary glands, stomach, liver, pancreas, spleen, the whole of the alimentary canal, and even the kidneys, lungs, and skin, as well as all the other organs of the body, bear a determinate relation to each other, and to the natural food of the animal. Various and wonderful are the contrivances and adaptations of nature, for removing from the system any foreign matter that may make its way into the blood, as well as any excess of such substances as are natural to it, which food improper as to quality or quantity may be the means of introducing. Nay, even so provident is nature, that when men absurdly persist in supplying the stomach with food that is unnatural, whether solid or liquid, the increased action to which any organ is excited, in order to rid the system of what is injurious, gradually enlarges the organ itself; so that it may the more energetically and efficiently perform the additional duty imposed upon it. But this can take place only within certain limits; and, in a great many instances, functional and finally structural disarrangement is the consequence of over-stimulation.

306. Without entering further into the nature of disease or its causes, we may show—1. That too stimulating a diet, or one that is unnatural in quality or quantity, is a very general cause of functional disorder. 2. That an abstemious diet of fruit, grain, and other farinaceous vegetables is, in general, the surest means of restoration to health. Let it, however, be clearly understood, that improper food is not considered the only means of introducing disease; inattention to exercise, pure air, cleanliness, the cutaneous and other excretions, together with a number of acquired and unnatural habits, may be equally effective in destroying health; and a man who lives temperately upon a mixed diet of animal and vegetable food, and is at the same time regular in other sanitary habits, will enjoy a far greater share of health, and be less liable to epidemic diseases, than the man who adheres strictly to a vegetable diet, but neglects all other physiological laws.

307. If fruit, and other products of the vegetable kingdom, be the natural food of man, of which much evidence has already been adduced, it is reasonable to conclude, *a priori*, that all the functions of the human frame will be best maintained in healthy action upon this diet; and the most readily restored by it to a normal state, when functional power has been weakened: and many eminent medical practitioners entertain this opinion.

308. "The effects of animal food, and other noxious matter," observes

Dr. Lambe, "of inducing and accelerating fatal disease, are not immediate, but ultimate effects. The immediate effect is to engender a diseased habit or state of constitution: not enough to impede the ordinary occupations of life, but, in many, to render life itself a long-continued sickness; and to make the great mass of society morbidly susceptible of many passing impressions, which would have no injurious influence upon healthy systems." (239.)

309. "Food in excess," says Dr. Clarke, "or of a kind too exciting for the digestive organs, may induce tubercular cachexia;—a circumstance which is not sufficiently attended to, I may say not generally understood, even by medical men. Nevertheless, I hold it to be a frequent cause of scrofula; and believe that it produces the same effect on the system as a deficient supply." Dr. Buchan observes: "Consumptions, so common in England, are in part owing to the great use of animal food;" and Dr. Lambe is of opinion, that scrofula and other diseases are frequently attributable to the same cause.

310. Abernethy says: "Animal substances are changed into a putrid, abominable, and acrid stimulus;" which was verified by Sir Edward Berry, who prevailed upon a man to live on partridges without vegetables; but, after eight days' trial, he was obliged to desist, in consequence of strong symptoms then appearing of an incipient putrefaction. "Errors in diet are the great source of disease: amendment of diet is the basis of recovery. The majority of our maladies medicine may relieve or suspend; but, without the aid of regimen, can never cure."*

311. Many believe that the abuse of animal food, as an article of diet, is connected with the introduction of certain diseases; some of which appear to be of modern date, and are yet unknown in many parts of the globe. Dr. Sigmond, in his work on mercury, &c., says: "It is stated that our living on animal food is the cause of the greater number of diseases to which man is subject." Dr. Alphonsus Leroy, of Paris, has just published an essay on certain diseases of men, which he traces to the animals on which they had fed; and he establishes the doctrine generally, that many diseases with which mankind are afflicted are communicated by eating the flesh of animals.

312. Measles are a complaint of recent origin; scarlatini still more recent; the latter having made its first appearance only two centuries ago. The small-pox is of no very ancient date; since Hippocrates, Galen, and the other Greek physicians, give it no place in their nosological histories; the first account of it being in the works of the Arabian physicians. We

* Thackrah's "Lectures on Digestion and Diet," p. 108.

learn from Barrow's Travels,* that, to this day, Southern Africa is wholly exempt from small-pox and canine madness. No writer mentions scurvy before Strabo, who tells us, that it broke out for the first time in Augustus's reign, at which period we know how luxurious the Romans had become.† The spontaneous origin of these and all other diseases, at some time or other, cannot be doubted; but by what combination of circumstances, or what influence an improper and unnatural diet has had in producing them, it is perhaps impossible to determine.

313. Diseases of the liver are much more common where a flesh-diet abounds. Dr. Copland informs us, that "eating largely or frequently, especially of animal, rich, and highly-seasoned food, stimulating the appetite by a variety of incongruous dishes and sauces, and spices and wines, particularly in warm countries and seasons, are most influential causes of these disorders. It is probably owing to such full and stimulating diet," continues he, "that hepatic diseases are more common in the officers than in the troops serving in the West Indies."‡ (202.) Perhaps the fable before alluded to, of the vulture devouring the liver of Prometheus—who is said to have been the first to use fire and animal food—may be intended to represent the effects produced upon that organ by the free use of flesh and its usual accompaniment, spirituous liquors. It is not improbable that the fibrous growths and hypertrophy of tissues are owing to the excess of fibrin supplied by animal food. The late Dr. Graham, of Edinburgh, was of opinion that intemperate butchers, those who were hired by the master butchers as slaughterers and assistants, were particularly prone to purpura hæmorrhagica. This class of individuals in Edinburgh is almost invariably addicted to drinking large quantities of ardent spirits, and lives chiefly on animal food. J. Wardell, M.D., also met with instances confirmatory of this opinion.§

314. "The man who forsakes not the law, and eats not flesh-meat like a bloodthirsty demon, shall attain good-will in this world, and shall not be afflicted with maladies." || "It is to be remarked," says Sir John Sinclair, "in favor of vegetable aliment, that it has no tendency to produce any constitutional disorders, as happens from animal food, and any effects it may have upon the body are almost entirely confined to the stomach and bowels, and seldom carry any injurious effect to the system at large. Its effects hardly ever appear in the bloodvessels." And, again: "Animal food is

* Vol. i., p. 408.

† Newton's "Return to Nature," p. 133.

‡ Medical Dictionary, article "Climate."

§ Prov. Med. and Surg. Journal, No. 5, 1849.

|| "Laws of Menu," in the Works of Sir William Jones, vol. iii. p. 206.

certainly more dangerous, and, in some respects, more wasting than vegetable. By exciting temporary fever after every meal, the springs of life are urged into constant, preternatural, and weakening exertions."

315. But it is by an abnormal production, or retention in the system, of certain acids and their compounds, with mineral and earthy matters, that many of the more common diseases arise; and it may be clearly shown that it is to the highly azotized articles of diet, such as animal food, that the increased production of these acids is principally owing; though an obstruction of the perspiration and other excretions may produce similar effects, by preventing the necessary elimination of those moderate quantities that result from the transformation of the tissues.

316. The more formidable acids are the lactic, the lithic, and the oxalic, with their compounds. Now, when the excretory organs—as the skin, kidneys, liver, and lungs—perform their functions properly, all such acids, and their compounds, as are the result of the decomposition of the organic structure, are separated from the system; and all the processes upon which life, health, and elasticity of mind depend, are uninterrupted. But there is another source of these acids; namely, when the quantity of food exceeds the wants of the system, or when it is of a kind or quality not suited to the assimilating organs. When more azotized food is taken into the stomach than is necessary to supply the waste of the muscular and other azotized tissues, the digestive organs may be sufficiently active to effect the necessary conversion into chyle, and in this state it may be taken up by the lacteals; but, as the blood becomes surcharged with elements of its composition, the surplus, like that arising from daily decay, must be carried off by the excretory organs, particularly the liver, lungs, and kidneys, which (owing to the conjoint influence of external cold repelling the cutaneous exhalations, animal food, and spirituous liquors) are abnormally stimulated; their functions are rendered more active, and their size frequently increased; but, like many an over-worked laborer, they too frequently fail to effect all that is required of them, and sink under the additional duty they are called upon to perform. Hence a frightful catalogue of painful and dangerous diseases, so common in northern climates, where large portions of azotized food are consumed.

317. Derangement of function may either terminate in disease of the organ itself, or the matter which it was formed for eliminating from the blood may excite a general fever or combine with other effete matters, and be deposited in other distant parts of the system, thus giving rise to local irritation and various acute disorders, such as gout, rheumatism, calculi, &c., which constitute what is usually called the lithic acid diathesis, so

prevalent among those who indulge in large quantities of azotized and stimulating food without proportionate muscular exercise. "In such quantities is urate of soda often generated, that the watery portions of the blood are not sufficient for its solution, and part of it is deposited in the joints and sheaths of tendons, producing painful swellings."* "The subjects of these diseases," observes Müller, "are generally persons who live well, and eat largely of animal food; whilst most urinary calculi,† gravelly deposits, the gouty concretions, and the perspiration of gouty persons, contain an abundance of lithic acid—a substance into the composition of which nitrogen enters in large proportions. By diminishing the amount of azotized substances in the food, the gout and gravelly deposits in the urine may be prevented."‡ Again he says, "The lithic acid of the urine, which resembles urea in containing a greater proportion of nitrogen than any other organic substances, is derived, without doubt, at least in part, from the new nutritive matter which the blood derives from the food; for its quantity in the urine is increased by merely taking animal food, or substances containing a large proportion of nitrogen; and in the urine of herbivorous mammalia it does not exist, being replaced by hippuric (urino-benzoic) acid."§ "In birds fed with substances containing nitrogen, the excrements contain much less white matter, or uric acid, than when they are fed with white of egg. In the composition of the urine of herbivorous and carnivorous quadrupeds, there is a difference corresponding with the difference of their food; the urine in the former animals contains hippuric acid. The urine of birds generally contains super-lithate of ammonia, but the urine of birds feeding on vegetables contains no urea."|| Dr. Willis takes the same view of the matter, and says, "The most efficient cause in engendering lithic acid is indulgence in large quantities of animal food."

318. "Strumous, lithic acid, and gouty diseases," says Dr. Prout, "are all results of mal-assimilation of the albuminous principle, either primary or secondary, and often run into each other. Thus gout and struma or scrofula are frequently, if not always, associated; and the gout and chalk-stones of old age may be considered as little more than modifications of scrofulous tubercle of youth—both being alike formed from mal-assimilation of the albuminous or azotized principle."

319. "That these diseases (gout, calculi, &c.) are, comparatively speaking, rare among the lower classes, is at once accounted for by the fact that

* Dr. Golding Bird on Urinary Deposits, p. 76.

† Uric acid forms the nucleus of by far the greater number of urinary calculi; five-sevenths of those at Guy's Hospital are of this kind.

‡ "Elements of Physiology," vol. i. p. 537.

§ *Ib.*, vol. i., p. 161.

| *Ib.*, vol. i., p. 163.

they do not take in any superfluous azotized food—all that they consume being appropriated to the maintenance of their tissues, and the kidneys having only to discharge their proper function of removing from the blood the products of the decomposition of these." * But as tubercular matter which gives rise to phthisis, scrofula, tabes, &c., is the result of imperfect conversion of food into organized matter, its presence in the system may arise from various other causes besides the superabundance of azotized food, particularly from low, innutritious diet, and from an unhealthy state of the secreting and excreting organs.

320. Notwithstanding the apparent correctness of these views, and the vast amount of additional evidence that might be adduced to substantiate them, certain chemists and physiologists have ventured to call them in question; some, perhaps, from a misapprehension of the term "low diet," or from not having fully and fairly considered the claims which a well-selected vegetable diet has upon their attention; and others from too hasty an adoption of certain theories or statements of Professor Liebig.

321. Dr. W. Tyler Smith has lately written a work on scrofula, in which he freely animadverts on the poor and insufficient food in many of the Union Workhouses, and makes the following observations on the advantages of a mixed diet: "Prout and Majendie have shown, by reasoning and experiments, that a mixed diet of the different kinds of animal and vegetable food is the most conducive to health. Such an admixture of alimentary substances seems to amount to almost a positive law; and is probably of more importance to those inclined to scrofula, than to any other class. Nevertheless, the children of the poor, and even of the rich, are often unduly stinted in the use of animal food; the one from the opinion that a vegetable and farinaceous diet is the most wholesome, the other from inability to procure a sufficiency of meat. There can be little question, looking at that state of the body which is most exposed to scrofula, that a purely vegetable diet—particularly in childhood, when the foundations of a weak or strong constitution can generally be laid—is most injudicious."

322. The experiments of Majendie have already been examined, (213, &c.) and it has been shown that they warrant no such conclusion as the above. We only learn from them that the unmixed proximate principles, whether derived from the animal or vegetable kingdom, are insufficient to support life; and that substances highly concentrated by artificial means are injurious to health. The experiments and reasoning of Dr. Prout certainly show the necessity for a due admixture of the aqueous, saccharine, albuminous, oleaginous, and perhaps ligneous principles, in human

* Carpenter's "Animal Physiology," p. 272.

food ; but these are found in combination in the various fruits, grain, roots, &c., which have been previously shown to be the natural food of man ; and it is only when we attempt to refine upon nature, that these principles are separated. None of the observations of Dr. Prout, however, prove the necessity for a mixture of animal and vegetable matter in human food ; nor can it be shown from Anatomy, Chemistry, Physiology, or any of the kindred sciences, that for the preservation of health man requires either an animal or a mixed diet.

323. That the children of the rich frequently suffer from feeding on too concentrated a diet,—such as preparations from the finest wheaten flour, arrow-root, &c.,—there can be no question ; but that their liability to scrofula, and other diseases, is consequent upon abstinence from animal food, is by no means a warrantable inference. If Dr. Smith's view of the subject were correct, we might expect to find scrofula exceedingly prevalent among the Hindoos, the Irish, the Scotch, and many other people in various latitudes, who either never or very seldom taste animal food ; and yet among these are found examples of the most robust health. Dr. Prout has shown, that mal-assimilation, which may occur under an animal, a vegetable, or a mixed diet, is frequently the exciting cause of tubercle. The inferior and unwholesome food, both of an animal and vegetable nature, upon which the poor are reduced to the necessity of feeding, may well be called “a low diet ;” though people in very humble circumstances prefer the finest flour, both for themselves and their children, as more economical. In the case of the adult poor, it is mixed with so many other things of an innutritious nature, that no ill consequences may result ; but to their young children, when it constitutes the principal part of their nutriment, it must be injurious.

324. Dr. Smith admits, that “fresh vegetables are of considerable importance in keeping the blood in a pure and wholesome condition, when the child has arrived at a proper age to digest any kind of food ;” and illustrates his remark by a reference to the prevalence of scrofula among the boys of Christ's Hospital ; which he attributes chiefly to the absence of fresh vegetables from their dietary : their supply of animal food being good, both as regards quantity and quality. “Gross living,” continues Dr. Smith, “is almost as influential as a poor diet in producing the disease, when the diathesis is highly developed. Scrofula is very common among some of the children of the poor, who are bloated from having a tolerable supply of food, and living without exercise, in confined apartments. Abundance of rich and stimulating food often renders strumous children so unweildy as to prevent healthy exercise : it disorders the stomach

and digestion, and vitiates the whole mass of fluids to such a degree, that blotches, or small indurations, form in different parts of the body, and produce scrofulous sores; or the slightest scratch or wound, in such cases, instead of healing, will begin to discharge, and speedily acquire the scrofulous character. Nothing is more common than for such children to get strumous disease of the scalp, obstinate scrofulous ophthalmia, otorrhoea, or discharge from behind the ears, and sores upon the mouth. In many cases, it almost seems as if scrofulous sores were set up, as a means of consuming the superfluous material which has been introduced into the body."

325. These latter observations of Dr. Smith accord with those of Dr. Prout; and there can be no doubt as to their correctness: for when muscular exercise is not proportionate to the amount of nutriment received, converted, and absorbed, nature is sure to set up some action to relieve the circulatory system from the excess; but Dr. Smith has adduced no facts to prove that a scrofulous habit is ever the consequence of an exclusively vegetable diet, when of a proper kind and quality; and if the account of the boys in Christ's Hospital may be depended upon, it is a proof of the injurious tendency of too animalized a diet. The diseases of the poor are attributable to many causes; such as impure air, dirty habits, exposure to cold, and a scanty, low, innutritious diet; consisting, frequently, of the worst quality of vegetable substances, and the offal of butcher's meat, perhaps rendered still more unwholesome by disease in the animal killed to supply it.

326. The views propounded by Liebig, respecting the ultimate destination of azotized and non-azotized articles of diet in the animal economy, are thought by some to sanction the use of animal food, and particularly where the lithic acid diathesis prevails. He is of opinion, that the amount of azotized matter in the urine may be regarded as a measure of the decomposition which takes place in the azotized tissues; and that the quantity of urea and lithic acid, the products of the metamorphosed tissues, increases with the rapidity of transformation in a given time, but *bears no proportion to the amount of food taken in the same period*. "There can be no greater contradiction," says he, "than to suppose that the nitrogen of the food can pass into the urine as urea, without having previously become part of an organized tissue." He also believes, that the use of wines, fat, oil, and other non-azotized articles of food, prevents the oxygen of the atmosphere from combining with the uric acid, to form urea. He further observes: "Gravel and calculus occur in persons who use very little animal food. Concretions of uric acid have never yet been observed in carnivorous mammalia, living in the wild state; and among nations which live entirely

on flesh, deposits of uric acid concretions in the limbs or in the bladder are entirely unknown."*

327. Relying upon these views as firmly established, Dr. Bence Jones (in his work on gravel, calculus, and gout) recommends a diet principally of animal food in these diseases: it becomes, therefore, a matter of great importance to ascertain whether these opinions of Liebig are correct. That urea and lithic acid are, in a great measure, the result of the transformation of the tissues, and vary (*cæteris paribus*) with the rapidity of decomposition; and that the quantity of lithic acid is increased by a deficient supply of oxygen, may be readily conceded: but that urea and lithic acid have no other origin than the transformation of the tissues, is certainly incorrect; and that non-azotized articles of food favor the production of lithic acid, by combining with the oxygen, is purely hypothetical, and contradicted by facts.

328. Majendie states that uric acid disappears from the urine of carnivorous animals, fed for about three weeks on non-nitrogenized food. Another fact mentioned by Professor Liebig to Dr. Bird, as having been lately observed at the hospital at Wurzburg, is to the same effect: "A girl, laboring under what appears to have been some form of hysteria, refused all food, excepting apples, of which she devoured an enormous quantity. On examining her urine, it was found to be alkaline, and contained a large quantity of hippuric, but no *uric acid*—like the urine of a horse or cow."† Hippuric acid contains eighteen equivalents of carbon, but only one of nitrogen.

329. It even seems more consistent with Liebig's own views to conclude that, as much oxygen is liberated by the chemical changes which take place during the digestion of non-azotized food, (200,) this very excess of oxygen may be employed in the conversion of uric acid into urea. His observations respecting concretions of lithic acid never having been found in carnivorous animals in the wild state, are equally applicable to herbivorous animals, when free and uncontrolled in their habits; because they then live upon such substances as are adapted to their organization, and are not tempted by artificial preparations to take more than the wants of the system require. But man acts in a far different manner: he freely indulges in all the varieties of artificially prepared food, which are contrived rather to gratify the palate than to satisfy the natural appetite;

* Opposed to this statement is the fact, that the Carnivora excrete from the kidneys much less than the Herbivora, which induced Dr. Wollaston long ago to recommend vegetable diet to those who were subject to gravel. Dr. Pearson also advised the same regimen, having observed that the concretions of herbivorous animals contain no lithic acid.

† "Urinary Deposits," p. 50.

and instead of preventing the injurious effects of repletion, by labor and exercise, he too frequently increases the evil by indulgence in sloth and inactivity. The excess of non-azotized food, in such circumstances, may be deposited as fat, (200, &c.) but the excess of azotized principles in the blood is not converted into muscle and other tissues: it must therefore be removed with the excretions, and pass off either by the kidneys or the skin; and this must ever be the case, when the supply exceeds the demand.

330. If no more nutriment be received into the system than is requisite to supply its wants, no azotized principles, it is probable, will appear in the urine, except such as have first formed a part of the animal fabric; but whenever an excess of food is ingested, there will be an accumulation of nutrient principles in the blood, unless means be adopted to prevent it. It is very probable "that the fibrin of the blood, like the solid tissues, has a limited term of existence *as such*; and that it must either be converted into solid tissue, or must undergo a change of composition." In the healthy state of the system, there is a constant demand for as much fibrin as the blood supplies; consequently there is no waste; but if the supply is greater than the demand, how can the excess be removed, except through the excretory organs especially concerned in carrying off the superfluous and effete azotized matters of the system; namely, the kidneys and the skin? Liebig states that the superfluous food of the luxurious is converted into various gases. This, no doubt, is partly the case; but the whole excess of azotized substances is certainly not thus disposed of; for the excretions from the kidneys, skin, &c., vary, in character and amount, with the quality and quantity of the food.

331. Dr. Prout has shown that a considerable difference exists between the *urina sanguinis*, or urine resulting from the secondary assimilating process, and the *urina potus vel chyli vel cibi*, or urine of primary assimilation. "There are few persons," says he, "in whom the urine of assimilation does not deviate, more or less, from the healthy standard, both in specific gravity and quantity; and the degree and nature of the differences often throw much light on the derangements of the assimilating organs. The urine of the blood, in general, is more uniform in its properties; but when it does vary remarkably from the standard of health, the deviation generally denotes some deep-seated and constitutional disease of an unfavorable character." And again: "With respect to diet, *quantity* is often of infinitely greater importance than *quality*. Thus, a full meal—whether of animal or vegetable* matters, or of a mixture of the two—will usually produce a

* If vegetable food *only* be taken, the effect here spoken of is doubtful, unless one or more of the excretory functions be much out of order.

deposition of gravel in predisposed individuals, in whom a *spare meal* of the very same materials is not followed by such deposits."

332. If Liebig were correct in stating that the urinary deposits result solely from decomposition of the tissues, they ought to vary little, in quantity or quality, from day to day, except when transformation is hastened by muscular exercise, disease, &c.; whereas it is a well-known fact, that excess of azotized food greatly increases these deposits, when little exercise has been taken to promote disintegration; it is, therefore, reasonable to conclude "that the superfluous azotized matter ingested passes off in the form of urate of ammonia, without becoming part of the tissues at all."

333. "There can be no question," says Dr. Golding Bird, "that all the phenomena of health and disease point out the probability of there being a double origin of this substance, (uric acid:) one from the nitrogenized elements of tissues, and the other from the elements of food, rich in nitrogen, which escape the completion of the process of primary assimilation. No experience yet collected justifies our assuming that uric acid bears any definite relation, in quantity, to urea; in all probability, Dr. Prout's opinion, that the latter is derived from the metamorphoses of a different set of tissues (the gelatinous) from those yielding the former, (the albuminous,) is correct, although it does not obviously admit of positive proof.* A diminution of albuminous matter in the food, therefore, so as to afford no more than the necessary supply to the tissues, is the most likely remedy in the lithic acid diathesis, and it has universal experience in its favor. "Who," says Dr. Graves, "ever heard of a case of gout among the potato-eating peasantry of Ireland?" "And who," observes a writer in the "British and Foreign Medical Review,"† "ever heard of one among the oatmeal-feeders of Scotland, or the rice-feeding Hindoos, low as is their oxygenation, in consequence of the warmth of the surrounding medium? Every practitioner must have met with examples, in which a simple reduction in the quantity of animal food ingested has caused an immediate disappearance of the lithic acid from the urine. Sometimes it is necessary to push this reduction to a still greater extent: thus, we have known an instance in which no decided benefit was obtained until the patient was restricted to the Hindoo diet of rice and capsicums, which procured a simple cure. Upon Dr. Jones' principles, this ought to have produced the most serious aggravation; for the diet which he recommends is one from which starch and other non-azotized substances are almost completely excluded."

* "Urinary Deposits," p. 47.

† No. XXX., April, 1828.

334. The following experiments fully confirm these remarks. Careful analyses were made of the urine from two persons, A and B; the former having lived during several years on an exclusively vegetable diet; the latter temperately on a mixed diet, excepting five days previously to the first experiment, when he purposely took a much larger portion of animal food than usual. Both had refrained during a long period from fermented and distilled liquors. The uric acid and urea obtained from the urine of twenty-four hours was as follows:

A.—1.8 grains of Uric Acid, and 181.29 grains of Urea.	
B.—8.0 do. 328.6 do.	

Nine months afterwards, the experiment was repeated, on the 14th of April, 1845, without any change of diet, except that A had occasionally taken very small quantities of the diffusible stimulants, and B much less animal food than at the former trial. The proportions were then as follow:

A.—1.69 grains of Uric Acid, and 187.58 grains of Urea.	
B.—2.19 do. 285.16 do.	

Immediately after this experiment, A lived freely during seven days on a mixed diet, taking a large portion of animal food during the same period, and B lived exclusively on a vegetable diet. On the 21st of April, the uric acid and urea were as below:

A.—3.14 grains of Uric Acid, and 252.16 grains of Urea.	
B.—1.259 do. 157.67 do.*	

335. In the first experiment, the uric acid eliminated in twenty-four hours by A, was one-sixth of the quantity eliminated by B, and the urea little more than one-half. In the second experiment, the uric acid was four-fifths, and the urea still about one-half. In the third experiment, the proportions were reversed; the urine of A containing $2\frac{1}{2}$ times the uric acid, and nearly $1\frac{1}{2}$ of the urea yielded by that of B. As the analyses were made with extreme care, and conducted in precisely the same way, reliance may be placed on their accuracy. The results of these experiments establish two material points:—1. That the urea and uric acid are not derived exclusively from the decomposition of the tissues. 2. That the quantity of each of these important compounds is increased by animal food, and diminished by a fruit and farinaceous diet. The views of Professor Liebig and Dr. Bence Jones upon these points cannot, therefore, be correct; and, if practically applied in the treatment of the lithic acid diathesis, would doubtless be productive of much mischief.

* See Appendix, B.

336. Experiments similar to the above were made by Dr. Lehmann, of Leipsic, who examined the quantity of urea and uric acid secreted by his kidneys, while living, for some days, on a strictly animal diet; on a purely vegetable diet; on a mixed diet; and on a diet quite free from nitrogen—consisting of starch, gum, oil, sugar, &c. The mean weight of the urea and uric acid obtained from the urine of twenty-four hours, in these circumstances, is expressed below in grains.

	Diet.—Animal.	Vegetable.	Mixed.	Non-nitro.
Urea in the urine of 24 hours	819.2	346.5	500.5	237.1
Uric acid ditto	22.64	15.7	18.17	11.24

337. The quantity of urea and uric acid here given, under each kind of diet, is much greater than is generally met with, and may be owing to some peculiarity in the constitution of the experimenter, or, more likely, to some error in converting the foreign weights into English grains. The evidence, however, is sufficiently clear as to the influence of food in modifying the proportion of urea and uric acid separated by the kidneys, and the results are similar to those obtained by the preceding experiments.

338. "From this table we learn," says Dr. Golding Bird, "that when living on a diet as free from nitrogen as possible, 11.24 grains of uric acid, and 237.1 of urea, were secreted in twenty-four hours. These quantities may be assumed as solely produced by metamorphosis of tissue; inasmuch as there existed no other source for them. On confining himself to a strictly animal diet, Lehmann found in his urine 22.64 uric acid, and 819.2 urea; being 11.4 more of the former, and 582.1 more of the latter, than can be accounted for by the disorganization of the tissues of his body, and, consequently, must have been derived from the ingesta. On mixing vegetable food with his meat, instead of finding an increased proportion of uric acid, (as the theory of Liebig would indicate,) this substance decreased, not only in the actual amount, but in the ratio it bears to the urea."*

339. It is possible, however, that the sudden adoption of a purely vegetable diet, by one who has been accustomed to live luxuriously, might prove injurious, and even increase the amount of lithic acid; for, if the digestive powers have been enfeebled by a long course of indulgence, an immediate return to a diet of fruits and vegetable matters might cause an increased secretion of oxalic acid, which, acting on the urate of ammonia might deposit the lithic acid; but, if cautiously adopted, a diet of farinacea and fruit will, in all cases, be of considerable service: and persons

* "Urinary Deposits," p. 45.

who have lived moderately on a mixed diet may, in most cases, make an immediate change, without any apprehension of ill consequences.

340. It may be here observed, that there are other causes of an abnormal production of lithic acid. When the functions of the skin, for instance, have been suspended, by cold or other means, an excess of nitrogen is retained in the blood, and is ultimately separated by the kidneys, in the form of urate of ammonia or urea. Sequin observed that perspiration was lessened during digestion, and considerably diminished when this function was imperfect: food of any kind, therefore, taken in too large a quantity, may, by overloading the digestive functions, indirectly cause a deposit of uric acid, independently of the nitrogen contained in the meal, from which the urate of ammonia might be formed. Even chloride of sodium, (common salt,) when taken in excess, may contribute materially, not only to the deposition of the lithic acid, but also to the formation of chalk-stones (lithate of soda) in the joints; and as physiological chemists appear to have overlooked, or not sufficiently attended, to the combinations thus arising, I hope I may be excused endeavoring to point out how these may take place according to the well-known laws of chemical affinity. Hydrochloric acid is admitted to be an important agent in the process of digestion, and common salt, when taken as a condiment, or as existing in all vegetable products, is also supposed to be the origin of this acid.²⁸ It is well known that vegetables, during their growth, decompose water, and there is little doubt that this is the case in the animal economy. Now, as water consists of one equivalent of oxygen and one of hydrogen, and as common salt is formed by one equivalent of sodium and one of chlorine, the following transformations may take place in consequence of the decomposition of the water. The chlorine of the salt may combine with the hydrogen to form hydrochloric acid, and the oxygen unite with the sodium to form soda: if these two new products should be in such excess in the system as not to be eliminated by the liver and other excreting organs, the hydrochloric acid, meeting with the lithate of ammonia, effects another change; by combining with the ammonia, the lithic acid is either precipitated, forming gravel and other urinary calculi, or the lithic acid unites with the soda and forms lithate of soda; hence it is that gouty concretions and gravelly deposits may either simultaneously or alternately afflict the same individual. Lactic acid, which, according to Berzelius, is a universal product of the spontaneous decomposition of animal matters within the human body, may also, by dissolving the union between the ammonia and the lithic acid, frequently cause the deposition of the latter.

[NOTE 28. This supposition, however, must be erroneous; for animals and human beings who never use salt in any form, are not in the least deficient in its acidulous property. I am of opinion that chloride of sodium can be manufactured by the vital machinery to any extent that the system requires it, even from those kinds of food in which chemical analysis does not detect it. There are many reasons for regarding common salt, when found in the excretions, as an excrementitious substance, as well as urate of soda, phosphate of ammonia, &c. T.]

I shall conclude these observations upon diseases arising from an abnormal production of lithic acid, with the following authorities and cases.

341. Dr. Craigie observes: "Diet consisting of bread and milk, or rice and milk, or the flour of farinaceous seeds and milk, is quite adequate to prevent the formation of the gouty diathesis, and to extinguish that diathesis if already formed. Such diet is also adequate to prevent the disease from appearing in its irregular form, and affecting the brain and its membranes, and the heart or lungs. If further arguments were required, in proof of the position that milk and grain-diet, (not in large quantity,) or diet of boiled vegetables and milk—while both necessary and adequate to the cure of gout—is perfectly safe, and much less injurious than diet of animal food, they may be found in the facts observed in the physiological relation between the stomach on the one hand, and the lungs on the other."* Dr. Cullen entertains the same opinion of vegetable diet: "I am firmly persuaded that any man who, early in life, will enter upon the constant practice of bodily labor, and of abstinence from animal food, will be preserved entirely from gout." With respect to rheumatism, he observes: "The cure requires, in the first place, an antiphlogistic regimen, and particularly a total abstinence from animal food, and from all fermented and spirituous liquors." Dr. Cheyne informs us that the Prince of Condé, after having long suffered from, and being quite overcome by the gout, was advised by his physicians, for the relief of his pain, to enter upon a *vegetable diet*, and a total abstinence from fish, flesh, and wine. It succeeded accordingly; his pains were relieved, and the gout was overcome.³⁰

[NOTE 29. It would puzzle, I think, those of our medical gentlemen who admit the propriety of a strict vegetable diet for the cure of gout and rheumatism, yet contend for the necessity of a return to flesh-eating as soon as recovery takes place, to give a reason for their dietetic philo-

* Elements of the Practice of Physic, vol. II., p. 633.

sophy. To me the statement that the food which is capable of ridding the system of disease, and restoring its functional integrity, is not best calculated to preserve its normal condition, seems intrinsically absurd ; and I have never yet been able to draw out of a medical man a single reason for a contrary opinion. T.]

342. One of the most remarkable cases of the beneficial effects of vegetable diet in gout, is that of Mr. Thomas Wood, of Billericay, in Essex, recorded by Sir George Baker, in the Transactions of the Royal College of Physicians. This person—from living freely on large quantities of fat meat, with butter, cheese, ale, &c.—became exceedingly corpulent ; and began, in his fortieth year, to suffer severely from heartburn, sickness, headache, violent rheumatism, and frequent attacks of gout ; he also had two epileptic fits. These symptoms continued, increasing in severity, during a space of nearly five years ; when, in consequence of reading the work of Cornaro on health, he first diminished the quantity of animal food, and finally discontinued the use both of it and ale ; living entirely on boiled pudding and sea-biscuit, which he partook of only twice in twenty-four hours. Under this regimen, Mr. Wood not only got rid of the rheumatic pains and gout, but became strong, vigorous and agile. He was able to carry five hundred pounds' weight, which was more than he could lift when he ate animal food and drank freely of ale. He enjoyed good health till his sixty-fourth year ; when he died from inflammation, brought on by exposure to cold. Had his diet been regulated by more correct principles, and had other physiological laws been observed, it is probable he would have escaped the illness that caused his death, and have lived to extreme old age.

343. We are informed by Dr. Golding Bird, that a patient at Guy's Hospital recovered from a severe rheumatic attack by the same means. After a temporary recovery, by a judicious administration of medicine, "he went out of the hospital, took cold, checked the perspiration, and the uric acid deposit appeared as abundantly as before. He was again relieved by the diaphoretic treatment, but soon afterwards relapsed. It was therefore determined to confine his diet to arrow-root, sago, potatoes, and bread and butter ; excluding the four ounces of cooked meat he had previously taken daily. The effect was very remarkable : the deposit almost immediately disappeared ; and he remained free from it till the time when he was discharged. On one occasion, the urine of this man deposited, in twenty-four hours, upwards of thirty grains of uric acid."

344. The oxalic acid diathesis, producing oxalic calculi, is generally

regarded as a mal-assimilation of the saccharine principle; consequently sugar, vegetables containing starch, and rhubarb, which contains oxalic acid, are interdicted to the patient, and are regarded by many as causes of the disease. Yet we have seen (192) that the negroes in the West Indies, when living on crude sugar, are healthy and strong, and, I believe, this disease is not known among them, and seldom if ever met with amongst vegetarians in any part of the world. Dr. G. Bird says: "From the symptoms presented in cases of this disease, there is no difficulty in proving to a demonstration the positive and constant existence of serious functional derangement of the digestive organs, especially the stomach, duodenum, and liver. And further, that the quantity of oxalic acid generated is to a considerable extent under the control of diet; some articles of food, *free from oxalic acid*, at once causing the excretion of this substance in large quantities, while others appear to have the effect of totally checking it." He also asks, "Is it not a legitimate conclusion to suppose that the disease under consideration ought to be regarded as a form of what has been aptly termed by Dr. Willis 'azoturia,' in which the vital chemistry of the kidney has converted part of the urea, or the elements which would in health have formed this substance, into oxalic acid?" Dr. Prout informs us that "gelatine," which contains more azote than any other proximate principle, "is, in some states of disease, converted into the saccharine principle and urea, sometimes into oxalic acid and carbonate of ammonia." We may, therefore, infer that oxalic acid, when constituting disease, has a similar origin to lithic acid, the one also being convertible into the other; and that the most appropriate diet in each disease is a mild and nutritious one, consisting of rice, oatmeal, and other farinaceous articles, milk and fruit being added when they produce no inconvenience to the digestive organs.

345. In that usually fatal disease,* diabetes mellitus, a diet consisting almost exclusively of animal food is considered by most practitioners, absolutely necessary; and all vegetable productions containing starch or sugar are most scrupulously forbidden. But if fruit and farinacea are the natural and best food of man, they must be equally proper, when judiciously selected, in health and diseases of every description. Medicines which are unnatural to a man in a state of health, are doubtless of great use in disease; but food is simply intended to supply nutriment to the system, and to support respiration; and these purposes will always be best effected by such a diet as bears the closest relation to the structure of the

* Dr. Watson says: "I dare not affirm that diabetes, although a functional disorder, has ever been cured."

digestive organs. The general use of animal food in diabetes must, therefore, be attributed to an imperfect knowledge of the cause and nature of the complaint. Mal-assimilation may be regarded as the common origin of struma, gout, and diabetes; and the urinary deposits which appear in each of these diseases, vary with the character of the ingesta; *lithates* abounding when an excess of azotized aliments is taken, and *sugar* when much non-azotized food is used. Dr. Prout observes, that "a saccharine condition of the urine exists in dyspeptic and gouty individuals much oftener than is supposed: hundreds pass many years of their lives with this symptom more or less present, who are quite unaware of it, till the quantity of urine becomes increased."* *Gout* and *struma* may arise in consequence of more food being taken than the assimilating organs (although in a comparatively healthy state) are able to vitalize; but the proximate cause of *diabetes* appears to be derangement of the digestive organs, and the symptoms vary with the progress of the disease. The first stage is often attended with a sub-inflammatory condition of the stomach, which prevents the complete assimilation of the food, even when taken in moderate quantities. The saccharine state of the urine, which distinguishes the true diabetes mellitus, is sometimes preceded by an imperfect conversion of the oleaginous principles into fibrin; in consequence of which, fat either accumulates in the system or is removed from it with the excretions: this may be considered the second stage of the disease, and may exist long before its real nature is suspected. As the functional or organic derangement increases, the third stage advances; consisting in a want of power in the assimilating organs to change the saccharine principles of food into the oleaginous: consequently, the fat hitherto existing (probably in abundance) disappears, and the body becomes greatly emaciated; for the food, instead of contributing to the nourishment of the body, by its gradual conversion into fibrin, is expelled from the system in the form of a low sugar. If, at this stage of the complaint, the patient can be induced to dispense with all articles containing the amylaceous or saccharine principle, and confine himself to a simple animal diet, the symptoms will be alleviated, and the amount of sugar in the urine will be less, simply because less saccharine matter has been taken into the stomach; or its presence may be disguised by the accumulation of urea and uric acid derived from the azotized food: but the diseased state of the functions and organs may still remain the same. Sugar continues to be excreted by the kidneys, even when an exclusive diet of animal food is adopted; which has induced some to believe, that the assimilating organs have not only lost their power of

* Nature and Treatment of Stomach and Renal Diseases, p. 34.

converting the saccharine group of aliments into fat and fibrin, but have also acquired the property of changing the azotized compounds into sugar. It is probable, however, that the fat previously deposited in the cellular tissue is gradually absorbed and carried to the stomach, which, from its diseased condition, is unable to effect the necessary changes: the fat is therefore resolved into sugar, and expelled from the system by the kidneys. The numerous experiments of Dr. Capezzuoli tend to prove that the quantity of sugar found in the urine of diabetic patients keeps no proportion whatever to the starch in the aliments; and that even under the influence of an alimentation entirely consisting of neutral nitrogenous substances, the urine was found to contain the same quantity of sugar as during a farinaceous alimentation. Dr. Bernard, in *Archives Générales de Médecine*, infers from many careful experiments:

1. That diabetic sugar is a normal ingredient in the blood and liver of animals.
2. That the formation of sugar takes place in the liver, and independently of saccharine or feculent food.
3. That this formation of sugar commences before birth.
4. That it is allied to a state of integrity of the pneumogastric nerves.

Dr. Prout says, "The power of appropriating the saccharine principle is the last that ceases to exist in an animal; and thus often remains, to a certain extent, long after the power of appropriating albumen and oil has ceased." He also says he has never known saccharine urine to exist in any other animal than man, which is probably owing to his living upon an unnatural diet. That it does not entirely depend upon the amylaceous or saccharine matter introduced from without, is proved by the fact that those who live exclusively on these aliments are almost universally free from the disease. As in dyspepsia, (203 and 357,) a well-regulated diet of animal food, and a sparing supply of vegetable matter, will be much more beneficial to the diabetic patient than the indiscriminate use of all kinds of food of which he may be tempted to partake; but on a mild farinaceous diet, exclusive of all animal food, there would be a much better prospect of recovery, although the saccharine state of the urine might for a while be increased by it. The presence of sugar in the excretion is only a *symptom*, not a *cause* of the disease; and as an azotized diet may diminish the amount of sugar without curing the complaint, so a purely farinaceous diet may, by its mild and nutritious qualities, gradually restore both organ and function to health, though the symptoms should appear at first to be aggravated. A medical friend informed me that he had a diabetic patient

some years ago, who could not be induced to restrict himself to animal food ; he lived almost exclusively on oatmeal stirred into boiling water or milk. He improved rapidly under so mild a diet, and it is said he completely recovered ; but probably his case had not been watched sufficiently long after his improvement to ascertain the result. A physician, in considerable practice, also informs me that in consequence of the invariable fatality of the disease under the usually prescribed diet of flesh, and bread composed of gluten only, he had recommended, in a well-marked case of diabetes, a strictly farinaceous diet, with as beneficial effects as he ever observed under animal food, &c. The patient is still under his care, but considerably improved.

CHAPTER VII.

INJURIOUS EFFECTS OF ANIMAL FOOD.

346. MANY, it must be allowed, partake of large quantities of animal food, without suffering from gout. An originally sound and vigorous constitution, with active excretory organs, may prevent an undue formation of lithic acid ; particularly in those leading an active life, and spending much of their time in the open air. The beneficial effects of long-continued muscular exercise, under a highly azotized but simple diet, is seen in the Pampa Indians of Buenos Ayres, who live almost entirely on mare's flesh and water ; and yet the diseases dependent upon an excess of lithic acid are not known among them ; because, when not sleeping, they are almost continually on horseback ; and, being accustomed to this kind of exercise from childhood, they acquire the power to ride very great distances with comparatively little fatigue. "The mare's flesh which they eat," says Sir Everard Home, "is tough and lean ; so that they only satisfy hunger, and never grow fat ; but when they accidentally get a buffalo, and indulge much in eating fat, it makes them feverish, and takes away their appetite. By fasting a day or two, however, they get well. By virtue of the great simplicity of their diet, and their constant exercise on horseback, in the open air, they enjoy remarkable uniformity of health ; and many of them are very athletic, and capable of great endurance, especially in those feats and exploits which are performed on horseback." Those who are disposed to imitate the Pampa Indians in their muscular exertions, and in their

simple mode of living, may venture to satisfy their appetites with the flesh of animals; those, however, who would enjoy health with a moderate share of exercise, will do well to adopt a diet more natural to man.

347. Flesh, even when obtained from healthy animals, is more stimulating than it is desirable that human food should be, and has a tendency to create an unhealthy state of the blood, and to produce gout, apoplexy, and other diseases, as we have already seen. But the bad effects of animal food upon the human frame are not confined either to its stimulating or azotized qualities, for animals are exposed in various ways—particularly by confinement, overfeeding, and unnatural food—to the attacks of many diseases; and, though the generality of mankind are not in danger of feasting upon animals that have actually died from disease, yet there cannot be a doubt that many are led to the slaughter with solids as well as fluids in a state far from healthy, and such as must prove (in some degree) detrimental to those who feed upon them. As Plutarch observes, “we chew the sores of some, and participate of the sap and juices of the deadly wounds of others.”

348. “Herr Wauruch (of Vienna) states, that persons affected with tænia are mostly between fifteen and forty years of age; and that persons most concerned with animal provisions were those observed to be chiefly attacked; for, of the two hundred and six patients at an hospital in Vienna, one was a man, and fifty-two were women—cooks, several were butchers, and eleven were eaters of large quantities of meat. Among predisposing causes, the principal were a habitation in a damp neighborhood, and the use of injured aliments, as bad bread, flour, butter, potatoes, &c., but particularly bad mutton, pork, and water.” * A man named Chapman, a laborer at Horsham, and two of his children, died in June, 1844, from eating meat in a putrid state. The cow, of whose flesh they partook, died of the murrain.† In the spring of 1841, four members of a family had made their dinner, in their usual health, from a part of a sheep which had died from a disease then prevalent among cattle. Their symptoms somewhat resembled those of irritant poisoning, accompanied by others indicating an affection of the nervous system. One of the patients, a child, died in less than three hours; the others recovered. There was no poison discovered in the food, nor in the body, nor was any poisonous vegetable used at the meal. The effects could only be explained by supposing that an animal irritant poison was in some unknown manner generated in the food.‡ In the *Medical Gazette* for November, 1842,

* *Lancet*, May 18, 1843.

† *Leeds Mercury*, July 6, 1844.

‡ *Guy's Hospital Reports*, April, 1843.

there is an account of the case of three persons who died from the effects of liver sausages, which had been made from an apparently healthy pig slaughtered only a week before. The inspection threw no light on the cause of death. The poisonous effect was supposed to depend on a partial decomposition of the fatty parts of the sausages.

349. In the "Edinburgh Medical and Surgical Journal," for July, 1844, it is observed, in reference to the poisonous properties of the *flesh of diseased animals* used as food, that "in America there are certain regions extending for many miles in length, and some miles in breadth, on the herbage of which, if an animal feeds, its milk and flesh acquire poisonous properties, yet itself enjoying tolerable health."³⁰ In Aurillac, in France, not many years since, fifteen or sixteen persons were attacked with symptoms of cholera, after taking the milk of a certain goat. The goat died of cholera about twenty-four hours afterward; and Professors Orfila and Marc gave it as their undoubted opinion that the cholera symptoms alluded to were caused by the milk. Dr. Alcott says he has known oysters, at certain times and seasons, produce the same symptoms. "It is probable, also, that the species of phthisis to which cows are liable—in which it has been ascertained that the milk contains seven times more phosphate of lime than usual—may be attended with injurious results." The very exercise of the passions may have such influence upon the milk as to render it dangerous to children of weakly constitution; and infants have been thrown into convulsions and died, in consequence of drinking the milk of nurses, after a paroxysm of rage: we may therefore conclude that the blood and other secretions of animals that have been over-driven, or greatly excited, will prove highly injurious to persons predisposed to disease.

[NOTE 30. The "milk-sickness," or "trembles," which has prevailed in several of our Western States, usually commences about the first of July, and disappears when vegetation is destroyed by the frost. It has generally, if not always, prevailed along the borders of streams, although it is said to have disappeared wherever the timber has been removed and the land cultivated. What the precise poison is that affects the cattle is unknown; but, when an animal becomes diseased in this way, its milk or flesh readily communicates a virulent fever to those who employ it as food. This fever has terminated fatally in a majority of cases. T.]

350. In the present flesh-eating age of Great Britain, perhaps no complaint is more general than caries of the teeth; and, as animal food is a frequent cause of indigestion, it thus conduces to the decay of those useful

portions of the human fabric. But there is a more direct mode by which animal food produces this effect. Bell, Fox, and other writers, attribute the decay of the teeth to inflammation, situated either in the lining membrane or the proper bone of the teeth; but Mr. Robertson, a late author, proves—by a number of considerations drawn from the structure, physiology, and development of the teeth, and from operations performed on them—that caries is the result of chemical action of decomposed food upon the teeth, and not of inflammatory action. Upon examination, it will be found that there are fissures formed in the enamel of the teeth, in consequence of the irregular distribution of that substance upon the surface; also, that there are interstices, caused by the crowded position of the teeth, and irregularity of the shape; and as the fibres of animal food retained between the teeth undergo a process of decomposition, by the action of oxygen, they acquire the property of corroding, disuniting, and thereby destroying the earthy and animal substances of which the teeth are composed. At first there is formed but a very small hole, which is increased by the daily action of the same causes; the phosphate of lime is gradually disintegrated by the carbonic acid, aided by the secretions of the mouth, until at length the nerve becomes exposed, and toothache is the result. Vegetable food is not so liable to be detained between the teeth; and when this does occur, it is not so injurious, because the starch of which this food principally consists is much more easily acted on by the saliva, and converted into gum or sugar—one of the nutrient principles. The popular notion that sugar injures the teeth is incorrect, except in cases where, by its admixture with other substances, it causes indigestion. “It has been alleged,” says Dr. Wright, “that the eating of sugar spoils the color of, and corrupts the teeth: this, however, proves to be a mistake; for no people on the earth have finer teeth than the negroes in Jamaica.”* It has been previously shown (61) that the teeth of the Carnivora are formed for tearing, and not for masticating, and stand like the teeth of a saw; by which means the particles of flesh, which so readily putrefy, have no chance of lodging between them, and, consequently, they are less subject to decay than those of man when he feeds on flesh, as they are formed for a different action and for different food.³¹

[NOTE 31. As far as I have been able to collect information on the subject, vegetarians are seldom troubled with toothache or rotting teeth; and those who are vegetarians physiologically are almost entirely exempt from decaying teeth or spongy gums. Indeed, I know many individuals

* Dr. Wright's “Medical Plants of Jamaica.”

who have been speedily cured of both, by adopting a consistent vegetable diet. T.]

351. Animal food, however, is not the only article which induces premature decay of the teeth; for "whatever causes a general disturbance of function, and a morbid irritability of the nervous system, assails the teeth in common with all the other organs; but they will react against such causes with more or less vigor, according as the performance of their function, and other circumstances, are more or less favorable to their health. If the food is soft and hot, or concentrated, or high-seasoned, or otherwise vicious, and mastication is neglected, incrustations of tartar will gather around the neck of the teeth, inflame the gums, separate them from the enamel, and irritate the membrane which surrounds the roots; thus bringing on premature decay.* The teeth being products of the epidermis, their healthy condition is as much influenced by that of the mucous membrane of the alimentary canal as the cuticle and hair are by the condition of the cutaneous organs; consequently indigestion, from whatever cause, must have an injurious influence on the teeth.

352. When we discover the remains of the inhabitants of our own country that were interred two or three hundred years ago, when animal food was little used except by the wealthy, and when a greater simplicity of diet prevailed, we generally find the teeth in a good state of preservation. Sir John Sinclair says: "There is no particular, in respect of which former generations seem to have enjoyed a greater superiority over the present, than with regard to the duration of their teeth. A place of interment was lately opened at Scone, near Perth, in Scotland, which had remained untouched for about two hundred years; and yet, to the astonishment of every one, among a great number of skeletons which were there discovered, there was hardly any of them whose teeth were not entire and sound. This must be ascribed to greater simplicity of diet, to the teeth being less injured by fumes from a disordered stomach, to the custom of drinking hot liquors being then unusual, and perhaps to the absence of scorbutic complaints." It was remarked, also, that several skeletons recently discovered while making alterations in the ground near Old Malton Abbey, had the teeth quite perfect, and free from all symptoms of caries, although the persons to whom they belonged had evidently lived much beyond the meridian of life.

353. An intelligent sea-captain, who had visited most parts of our globe, informed Mr. Graham that he found those people who used hot liquids and

* Graham's Lectures, vol. i. p. 591.

hot food, and smoked tobacco and other narcotic substances, always had black and much-decayed teeth; but that in the islands of the Pacific, and other parts where the people seldom or never take any thing hot into their mouths, use little or no animal food, and are very simple, plain, and natural in their diet, they had very regular teeth—white, clean, and free from decay. In Mexico the higher classes consume great quantities of animal food, generally eating it three times a day, and they are noted for the early decay of their teeth and for nervous complaints; whereas the Indians residing in the same locality, but who live on vegetable produce, are remarkable for their fine white teeth, for their mild expression of countenance, (446, &c.), and for their general good health.* (276, 388, 473.) "A medical gentleman," says Graham, "who formerly spent fifteen years in one of the remote counties of the State of Maine—where the principal business carried on was that of getting out lumber, and where the inhabitants, with active and industrious habits, knew nothing of luxury, but subsisted on a plain, simple, and coarse diet—stated that the people were very remarkable for their fine white and regular teeth, which were wholly free from decay; and that, although he was the only surgeon in the county, he had occasion to extract but one tooth in the whole fifteen years; and he finally left that part, because he found no professional business to attend to."†

CHAPTER VIII.

BENEFICIAL EFFECTS OF VEGETABLE FOOD ON INVALIDS.

"We have known various persons who have been delivered from painful and obstinate disorders by giving up the use of animal food entirely; and others in whom disorders of the nervous system and the chest had been very much relieved by the same procedure."—EDINBURGH MEDICAL AND SURGICAL JOURNAL, No. 166.

354. The little I have now stated may be regarded as sufficient to warn us against too free an indulgence (at any rate) in a diet of animal food. I shall proceed to show the good effects of a return to natural and simple diet, upon those who suffer from disease. Dr. William Alcott, of North America, who (in 1838) published a work on vegetable diet, informs us

* See "Life in Mexico," by Madame C—— de la B——.

† Lectures on the Science of Human Life, vol. i. p. 518.

that Dr. Milo L. North—a distinguished practitioner of medicine in Hartford, Connecticut—addressed a circular, or letter, and questions, to the editor of the “Boston Medical and Surgical Journal;” requesting his medical brethren to give him information as to the effects of a vegetable diet upon any individuals who had been under their care, or whose cases were known to them; for a great number of people, of all classes, have tried this diet in America. The same queries were also inserted in the “American Journal of Medical Science” of Philadelphia; and were copied into numerous papers. In the course of a few months he received a number of letters, which were almost unanimous in stating, that a change from an animal or mixed diet to one consisting exclusively of fruit and farinacea, with no other beverage than water or milk, was attended with the most beneficial results, as regards health and strength, both corporeal and mental.

355. Dr. North prefaced his questions with the following observations: “Reports not unfrequently reach us of certain individuals who have fallen victims to a prescribed course of regimen. These persons are said, by gentlemen who are entitled to the fullest confidence, to have pertinaciously followed the course, till they reached a point of reduction from which there was no recovery. If these are facts, they ought to be collected and published.” We are assured by Dr. Alcott, that not a case of any one having fallen a victim by the adoption of a vegetable diet, is found in the whole catalogue of returns to Dr. North. “Not a fact is brought,” says he, “or an experiment related, in a list of from thirty to forty cases, (reported, too, by medical men,) which goes to prove that any injury has arisen to the healthy from laying aside the use of animal food. In almost every instance, the reply to Dr. North indicates that bodily and mental labor was endured with less fatigue than before; and that an increased activity of mind and body was accompanied with increased cheerfulness and animal enjoyment. In nearly every instance, strength of body was actually increased; especially after the first month.” Of the answers that were received by Dr. North, I shall make free use, for the purpose of showing the influence of vegetable diet in cases of disease.

356. Dr. Parmly, dentist, Park Place, New York, thus writes:

“My Dear Sir: For two years past, I have abstained from the use of all the diffusible stimulants; using no animal food, either fish, flesh, or fowl; nor any alcoholic or vinous spirits; no form of ale, beer, or porter; no cider, tea, or coffee: but using milk and water as my only liquid aliment; and feeding sparingly, or rather moderately, upon farinaceous food, vegetables, and fruit, seasoned with unmelted butter, slightly-boiled eggs, and sugar or molasses; with no condiment but common salt. I adopted this

regimen, in company with several friends, male and female ; some of whom had been afflicted, either with dyspepsia, or some other chronic malady. In every instance within the circle of my acquaintance, the symptoms of disease disappeared before this system of diet ; and I have reason to believe that the disease itself was wholly or in part eradicated. In answer to your inquiry, whether I ascribe the cure, in these cases, to the abstinence from animal food, or from stimulating drinks, or from both, I cannot but give it as my confident opinion, that the result is to be attributed to a general abandonment of the diffusible stimuli, under every shape and form. An increase of flesh was one of the earliest effects of the anti-stimulating regimen, in those cures in which the system was in a low condition. The animal spirits became cheerful, buoyant, and uniformly pleasurable. Mental and bodily labor was endured with much less fatigue ; and both intellectual and corporeal exertion was more vigorous and efficient." Dr. Joshua Porter, of North Brookfield, suffered nearly two years from dyspepsia ; and was rendered more wretched by frequent attacks of colic, with pains and cramps extending to his back : so severe had these pains become, that the prescriptions of the most eminent physicians afforded only partial relief. After living for a short time on milk, with coarse rye and Indian bread, which constituted his only food, he completely recovered ; and declared, that on this mild diet he could endure fatigue and exposure as well as any man ; his muscular strength considerably increased ; and every day added new vigor to his constitution. Dr. N. J. Knight, of Truro, says : " Some three years previous to my forming a determination to subsist upon farinacea, I had been laboring under an aggravated case of dyspepsia ; and about six months previous, also, under an attack of acute rheumatism. I was harassed with constant constipation of the bowels, and ejection of blood after eating, together with occasional pain in the head. From November, 1831, to November, 1836, my diet consisted of rye and Indian bread, stale flour-bread, sweet bread without shortening, milk, some ripe fruit, and occasionally a little butter. During this time, while I devoted myself to considerable laborious practice and hard study, there was no deficiency of muscular strength or mental energy. I am fully satisfied that my mind was never so active and strong." It appears that Dr. Knight has, since the above date, several times tried a diet of animal food, which, in each instance, was attended with such symptoms as to induce him to desist. He adds : " I am now satisfied, to all intents and purposes, that mankind would live longer, and enjoy more perfectly the 'sane mind in a sound body,' should they never taste flesh-meat or fish." Dr. Cook, Dr. A. Ball, of New York, and many other members of the medical profession, give similar testimony.

357. We have also well-authenticated facts of the good effects of a vegetable diet in cases of dyspepsia, in this country ; but, as the regimen is seldom tried here in these distressing complaints, and as members of the medical profession are, for the most part, in favor of a diametrically opposite diet,—generally recommending broiled mutton and stale bread, and a careful abstinence from most vegetables,—the instances of recovery under a vegetable diet are rare ; and, when recorded, the practitioner views them rather as phenomena to be wondered at, than as examples for our instruction ; and, therefore, continues rigidly to follow the rules that have been given *ex cathedra*. (203.)

358. Dr. Abercrombie mentions a remarkable instance of the beneficial effects of vegetable diet in a case of dyspepsia. "A young gentleman," says he, "had been for many years a martyr to stomach complaints ; seldom a day passing in which he did not suffer greatly from pain in his stomach, with flatulency, acidity, and the usual train of dyspeptic symptoms ; and, in particular, he could not taste a bit of vegetable without suffering from it severely. He had gone on in this manner for years ; when he was seized with complaints in his head, threatening apoplexy ; which, after being relieved by the usual means, showed such a constant tendency to recur, that it has been necessary ever since to restrict him to diet almost entirely of vegetables, and in very moderate quantity. Under this regimen, so different from his former mode of living, he has continued free from any recurrence of the complaints in his head ; and has never been known to complain of his stomach."*

359. "Two cases have recently fallen under my notice," says Mr. Charles Turner Thackrah, of Leeds, "in which the individuals, without professional advice, adopted a diet of vegetables. Mr. W. tells me that—suffering long under bilious disorders, and obtaining little relief from medical treatment—he tried a strict regimen of vegetables and water. His health and spirits, he assures me, have since been greatly improved ; and he is, consequently, a warm advocate of the *herbivorous* system. But, within the last two years, he has judiciously added to his dinner a moderate proportion of flesh. A gentleman from B., who had been under my care for a chronic disease, was induced, soon after his recovery, to try the vegetable system. After its use for some months, he informed me that it had removed an oppression from the head, which, though slight, had been before almost constant ; that his general comfort was increased, and his strength by no means reduced. But lately I learn, that he (as well as Mr. W.) has added meat to his dinner of herbs. In neither of these cases do I

* Abercrombie on Diseases of the Stomach.

doubt the advantages at first received ; but I conceive that it was not imputed to the true cause.* Had Mr. Thackrah been led to pay more attention to the subject of natural diet, and had he also been aware of the multitude of practical experiments which can be brought to verify the deductions of reason, he would probably not have been so strenuous an advocate of an animal diet as he here appears to be. Besides, like Lawrence and others, he seems to have mistaken a fruit and farinaceous diet for an herbaceous one, which is decidedly unnatural to man.

360. In a letter dated April 16, 1845, Dr. Lambé writes as follows : "From the age of nineteen to thirty-five I was constantly suffering from the usual symptoms of dyspepsia, which, towards the latter period, were accompanied by a constant and oppressive pain about the stomach. At the age of thirty-five I had an attack of enteritis, which was severe enough to require two venesections ; after this I never went out in the damp of the evening without feeling some tenderness over the abdomen. Under these circumstances, together with a general feebleness of health, I determined to try the effect of substituting distilled water for common water as my drink. The effect of this change was a thorough relief of the dyspeptic pains and abdominal tenderness. In the ensuing three years, a headache, from which I had occasionally suffered earlier in life, returned so frequently and so severely, as to induce me to take active measures for its relief. I then determined to abstain from animal food, as well as from the use of common water. The intensity of the paroxysms was instantly relieved ; yet they recurred, in a mitigated form, for at least thirty years. I have been engaged in the active duties of my profession until the middle of last year, which was the eightieth year of my life. Since then, from a partial failure in my sight, I have retired into the country ; where, making allowance for my time of life, I enjoy a good share of health."

361. About thirteen years ago I also suffered very much from dyspepsia, and was treated *secundum artem* by my medical adviser, who was eminent in his profession ; but I derived little benefit from either the diet or medicine which was prescribed for me. I adopted a vegetable diet, not as a remedy for my complaint, but for the reasons already mentioned, (Preface ;) and, after using this regimen for a very short period, I no longer suffered from a disease that had formerly been a daily and severe drawback upon the pleasures of existence. Like the patients mentioned by Mr. Thackrah, I have often resumed my flesh-eating habits, partly for the sake of experiment, and partly with a view of complying with the general usages of society, and to avoid singularity ; but, after a short time, I have always

* "Lectures on Digestion and Diet," p. 62.

had cause to repent the change, from the inconvenience and pain which were the consequence. I have now sufficiently tested the diet practically, and hesitate not to say that since I have totally abstained from animal food, I have possessed more health and strength of body, more peace and serenity of mind, as well as more intellectual enjoyment, than at any former period of life; and I trust that I shall never more be induced to depart from that simple mode of living which, while it has conferred on me the inappreciable advantages just mentioned, also yields more exquisite sensual gratification than I ever experienced on the most richly-flavored dishes of a former period.*

362. "Of the effects of a regimen of the farinacea, combined with milk and fruits," says A. P. Buchan, "in subduing the early attacks of phthisis, many examples are recorded; and there would probably be many more, were an appropriate regimen adopted rather with a view to prevent than to cure this disease." Dr. Caleb Bannister, of Phelps, (N. Y.,) whose ancestors, it appears, had all died of hereditary consumption, states as follows: "At the age of twenty, I began to be afflicted with pain in different parts of the thorax, and other premonitory symptoms of phthisis pulmonalis. Having a severe attack of ague and fever, all my consumptive symptoms became greatly aggravated; the pain was shifting, sometimes between the shoulders, sometimes in the side or breast, &c." After enumerating various other symptoms, (such as irritable pulse, &c.,) and stating that his life was despaired of, he says: "I was induced to try a milk diet, and succeeded in regaining my health; so that for twenty-four years I have been entirely free from any symptom of phthisis." (202 and 256.) "It will not be disputed," says Dr. Lambe, "that, for consumptive symptoms, a vegetable diet, or at least a vegetable and milk diet, is the most proper." Dr. Buchan again observes: "When there is a tendency to consumption in the young, it should be counteracted by strictly adhering to a diet of the farinacea and ripe fruits. Animal food and fermented liquors ought to be rigidly prohibited; even milk often proves too nutritious."

363. Scrofula, cancer, scurvy, epilepsy, dysentery, inflammation, ulcers, &c., may be included among the diseases which are greatly relieved, if not cured, by vegetable diet, as the ensuing facts attest. Dr. N. J. Knight, of Truro, records the following case: "Mrs. A., infected with scrofula of the left breast, and in a state of ulceration, applied to me two years ago.

* "The stomach being the organ in which animal food is dissolved, meat should not be given in gastric affections; whereas feculent substances, digested in the jejunum, can be safely permitted."—Dr. M'Carthy.

The ulcer was then the size of a half-dollar, and discharged a considerable quantity of imperfect pus. The axillary glands were much enlarged; and, doubting the practicability of operating with the knife in such cases, I told her the danger of her disease, and ordered her to subsist upon bread and milk and some fruit, drink water, and keep the body of as uniform temperature as possible. I ordered the sore to be kept clean by ablutions of tepid water. In less than three months the ulcer was healed, and her general health much improved. The axillary glands are still enlarged, though less so than formerly. She still lives simply, and enjoys good health; but she tells me, if she tastes flesh-meat, it produces a twinging in the breast."

364. Dr. Pemberton, after speaking of the general tendency, in our highly-fed communities, to scrofula and consumption, makes the following remarks: "If a child is born of scrofulous parents, I would strongly recommend that it be entirely nourished from the breast of a healthy nurse, for at least a year. After this, the food should consist of milk and farinaceous vegetables. By perseverance in this diet for three years, I have found that threatened scrofulous appearances have certainly been postponed, if not altogether prevented." Dr. Lambe's works supply numerous instances of cancer being relieved by the same kind of diet; and to his reports I refer the reader for further information.*

365. We are assured by Dr. Buchan, that "the most obstinate scurvy has often been cured by a vegetable diet; nay, milk alone will frequently do more in that disease than any medicine. Hence it is evident," says he, "that if vegetables and milk were more used in diet, we should have less scurvy, and likewise fewer putrid and inflammatory fevers." Sir Gilbert Blane, in his work entitled "*Diseases of the Fleet*," (1781,) mentions that raw potatoes sliced, with vinegar, have been found beneficial in scurvy. Lieut. James Grant, in his "*Narrative of a Voyage of Discovery*," (published in 1803,) says, "We found an American ship lying here, called the *Washington*, of Nantucket. Her commander, Jedediah Fitz, informed me that the American sailors had discovered potatoes eaten raw to be a very powerful antiscorbutic; and that their whaling-vessels constantly took a quantity with them to sea to eat raw, as an antidote against scurvy." Much more recently, Mr. Jullien Fontanellet† gave a brief sketch of their antiscorbutic effects on sailors; many of whom, he states, declared them-

* It is universally agreed that the diet of cancerous parents should be light, easily digestible, and succulent. Stimulants of all kinds should be carefully avoided, and a vegetable diet certainly combines these conditions.

† "*Journal de Pharmacie*," tome xxiv. p. 801. (1838.)

selves to have been cured of the scurvy by the long-continued use of potatoes very slightly baked under the ashes, and eaten without salt. Nauche, also, testifies to similar good effects of this vegetable, which he used in the form of a decoction. In the "*Lancet*" for September 3 and 24, 1842, are two papers—one by Wm. Dalton, M.R.C.S., and the other by Julius Berncastle, M.R.C.S.—on the beneficial influence of potatoes in sea scurvy, either eaten raw and sliced, like cucumber, with vinegar, or boiled, as generally used; in either way, they are said to prove an excellent antiscorbutic.

366. Dr. Baly,* Physician to the General Penitentiary at Milbank, has published some interesting observations on the antiscorbutic quality of the potato; and he declares, that its efficacy is not (as some had supposed) impaired by a boiling-heat, but, "*as ordinarily cooked, it is an admirable preservative against the scurvy.*" In 1840, he found that scurvy was a disease of rather frequent occurrence among the military prisoners; while among the convicts it was never seen. The exemption of the latter, he found, could be attributed only to their weekly diet containing 5 lbs. of potatoes and an onion. The military prisoners, therefore, were allowed 2 lbs. of potatoes weekly, during the first three months of their imprisonment; 3 lbs. during the second three months, and 4 lbs. after the expiration of six months. "This addition to the dietary of the military prisoners was made in January, 1842, and not a single case of scurvy has since occurred." Dr. Baly has also shown, from the Reports of the Inspectors of Prisons, that in those prisons where scurvy has prevailed, the diet of the prisoners, though often abundant in other respects, has contained no potatoes, or only a very small quantity; and that, in several prisons, the appearance of the disease has wholly ceased on the addition of a few pounds of potatoes being made to the weekly dietary. It may, therefore, be concluded from such an abundance of facts, that our present exemption from the scurvy is, in a great measure, owing to the general use of this valuable root.

367. A physician, in answer to Dr. North, states that he had been subject to severe attacks of epilepsy; but, having maintained a total abstinence from flesh, fish, and fowl, for two years and a half, he had been entirely free from any attack. He adds: "That this happy immunity from a most obstinate disease is to be attributed solely to my abstinence from animal food, I do not feel prepared to assert; but that my general health has been better, my attacks of disease far milder, my vigor of mind and body greater, my mental perceptions clearer and more acute, and my

* "*London Medical Gazette*," February 10, 1843.

enjoyment of life, on the whole, very essentially increased, I am fully prepared to prove."

368. Dr. Cheyne relates a remarkable cure of epilepsy, in the case of Dr. Taylor, who was, for a long time, dreadfully afflicted with epileptic fits. He tried the effects of medicine, and consulted all the most eminent of his brethren of the medical profession, in and about London; but obtained no relief. At last, he was obliged to follow the advice of Dr. Sydenham, whose works he had studied. He first discontinued the use of all fermented and distilled liquors; then, finding his fits become less frequent and less violent, he gave up all animal food, and confined himself entirely to cow's milk. In the course of a year or two he was perfectly cured; and, for seventeen years, enjoyed as good health as human nature is capable of. He assured Dr. Cheyne that, although considerably advanced in years, he could then play at cricket six hours without fatigue or distress; and was more active and clear in his faculties than he had ever been in his whole life. He also said he had cured a great many persons of inveterate distempers, by means of the same diet. Dr. Hayward, of Boston, in one of his lectures, alluded to the case of a young man at the hospital last spring, who had such severe epileptic fits that it was thought the pressure upon the brain could only be relieved by trepanning. A mild vegetable diet, however, brought relief. Sometime afterwards he ate freely of flesh-meat at a dinner, and his fits immediately returned with more violence than ever. A strict adherence to a plain diet again brought relief. Dr. Cranstown, after suffering greatly for four or five years from chronic dysentery, was cured completely by milk and farinaceous diet.

369. "The late Dr. Gregory, of Edinburgh, used always to mention in his lectures the case of Dr. Adam Ferguson, the celebrated historian, as affording one of the strongest illustrations he ever met with of the benefit that may be derived from timely attention to the avoidance of those circumstances which tend to produce plethora and apoplexy. It is, perhaps, the most striking of the kind on record. Dr. Ferguson experienced several attacks of temporary blindness some time before he had a stroke of the palsy, and he did not take those hints so readily as he should have done. He observed, that while he was delivering a lecture, his class, and the papers before him, would disappear, vanish from his sight, and reappear again in a few seconds. He was a man of full habit; at one time corpulent and very ruddy; and, though by no means intemperate, he lived fully. I say he did not attend to these admonitions, and at length, in the sixtieth year of his age, he suffered a decided shock of paralysis. He recovered, however, and from that period, under the advice of his friend, Dr. Black,

became a strict Pythagorean in his diet, eating nothing but vegetables, and drinking only water or milk. He got rid of every paralytic symptom, became even robust and muscular, for a man of his time of life, and died in full possession of his mental faculties, at the advanced age of ninety-three, upwards of thirty years after his first attack. Sir Walter Scott describes him as having been, "long after his eightieth year, one of the most striking old men it was possible to look at. His firm step and ruddy cheek contrasted agreeably and unexpectedly with his silver locks; and the dress which he wore, much resembling that of the Flemish peasant, gave an air of peculiarity to his whole figure. In his conversation, the mixture of original thinking with high moral feeling and extensive learning, his love of country, contempt of luxury, and especially the strong subjection of his passions and feelings to the dominion of his reason, made him, perhaps, the most striking example of the Stoic philosopher which could be seen in modern days." *

370. Dr. Cheyne—the celebrated physician alluded to in several preceding paragraphs—lived freely, and became so enormously stout that he weighed thirty-two stones, and was obliged to have the whole side of his chariot open to receive him. He became short-breathed, lethargic, nervous, and scorbutic; he tried the power of medicine in vain, and was only cured by resorting to a vegetable and milk diet. It is said that, upon this diet, he reduced himself to the weight of ten stones!

371. Dr. Joshua Porter, of North Brookfield, says: "I have been called to prescribe for a man who has been a flesh-eater for more than half a century. He was confined to his house, and had been losing his strength for several months; still keeping up his old habits. The disease which was preying upon him was chronic inflammation of the right leg; the flesh had been so long swollen and inflamed, that it had become hard to the touch. There were ulcers on his thigh, and some had made their appearance on his hip. This disease had been of seven months' standing; though not in so aggravated a form as it now appeared. After examining the patient attentively, I became convinced that the disease, which developed itself locally, was of a constitutional origin, and, of course, not to be cured by local remedies, which had been applied for the period above mentioned. All local applications were discontinued, and the patient was put on a vegetable diet, after the alimentary canal was freely evacuated. I saw this man three days afterwards: the dark purple appearance of the leg had somewhat subsided; the red and angry appearance about the base of the ulcers was gone, and his strength improved. Three days after I

* Lectures on the Principles and Practice of Physic, by Thomas Watson, M.D. 1848.

called, I found him in his garden at work. He is now—two weeks since my first prescription—almost well. All the ulcers have healed, with the exception of one or two.”

372. But the most remarkable cure of this kind is recorded in “The Lancet” for May 14, 1842, by Mr. S. Rowbotham, Surgeon, of Stockport. The son of Mr. Fielding, of that town, about three years old, had been ill eighteen months. He was covered, from head to foot, with ulcers: his eyes, nose, ears, mouth, and, in fact, his whole head and face, were involved in one complete mass of fetid running sores and ulcers; and the lower part of his body was equally bad; so that his little thighs seemed nearly separating from his body. For more than twelve months he had been quite blind; and had never been able to sit down, even on a pillow, but stood upon his foot, and leaned with his elbow upon the nurse—except at times when he was able to kneel on a pillow: he had scarcely been able to lie in bed for the same period. Eight of the most eminent medical men had given him up as incurable; and some of them declared, that no known mortal power could ever *improve* his condition, much less effect a cure. “From certain views which I held on the origin of disease,” says Mr. Rowbotham, “I was induced to recommend a diet consisting almost entirely of ripe fruits and honey, or sugar and treacle. The child commenced this diet on the 13th of September, 1841: he had stewed fruits, mixed with sugar or honey, to all his meals; and was allowed frequently to eat grapes, cherries, plums, apples, pears, and such other fruits as could be obtained. On the 16th, the sores on his back were beginning to disappear; on the 23d, he was very sensibly improved; on the 30th, one-half of his face was clear; the lower parts of his body were much better; and he could sit in a chair, and lie comfortably in bed. He continued daily to improve, till at last his eyes opened; but they were at first very weak, and he could scarcely see any thing: his sight, however, gradually improved. On the 1st of January, 1842, not a single ulcer remained on his body: the skin became remarkably clear and fair; and the features—which, for twelve months, had been in such a state that it was impossible to do more than guess at the position of his nose and eyes—were restored to their wonted appearance.”

373. The report of this case reflects great honor upon Mr. Rowbotham. Had he been influenced by mercenary motives, and a desire to acquire fame at the expense of truth, he might easily have done so, by attributing the cure to some occult treatment; but it does not appear that he employed any medicine. This case, therefore, may be regarded as going far to prove that a natural diet not only is the best food, but also the very best physic.

Such, however, is the force of prejudice and credulity, and the love of mystery, that we have far greater confidence in a few grains of nauseous vegetable matter, in the form of "Old Parr's" or "Morison's Pills," than we have in pounds of wholesome and pleasant vegetable matter, in the shape of fruit. Many will tempt the appetite with fruit, after a hearty dinner of sundry compounds, when it is almost certain to produce bad effects; but few think of making it a part of their daily meal, which is the proper way of employing it.

374. No sooner does a person make trial of a vegetable diet, than his friends (from the best of motives, no doubt) attempt to alarm him, by predicting bad consequences from what they esteem his folly. Even Dr. Dixon says of this diet: "I know of no complaint, except small-pox and the other contagious diseases, that it has not of itself produced." This may certainly be added to his list of "Fallacies of the Faculty;" and I challenge him to state a single instance in which *any* disease can be clearly traced to a properly-selected fruit and farinaceous diet. The facetious remarks which he makes respecting the advocates of an exclusively vegetable diet would be deserving of reply, were it not evident that, like many other opponents, he has totally misunderstood the question; his arguments being directed against a low herbaceous diet which I should think few, if any, would defend.

375. Some anticipate that, though a person under this diet is not so liable to inflammatory diseases, yet the low tone of his system exposes him more to the attacks of epidemics; and should he become the subject of any active disease, he would have so little stamina, under so poor a diet, that he would soon sink under the complaint. This assumption is perfectly gratuitous; having neither reason nor facts to support it. In the first place, we deny that a vegetable diet, in the true sense of the term, (as applied to man,) is a poor diet; and, in the second place, it has been shown (Chapters III. and IV.) that the health and strength of those who adopt it are (other circumstances being the same) much superior to the health and strength of those whose food consists wholly or partly of the flesh of animals. All the functions of the human frame maintain their normal state of activity much better under the former diet; and, consequently, such a degree of sensibility, contractility, and elasticity is communicated to the human fabric, as enables it much more effectually to resist malaria: probably, also, because the peculiar arrangement of elements which constitute miasma, meets with no similar arrangement in the blood; by which Professor Liebig supposes a process of fermentation is set up, thereby giving origin to disease. If, however, disease should attack a person thus living

according to nature, or if accident should befall him, the symptoms generally evince so slight a deviation from health, that a state of convalescence and recovery may be hoped for, by a little attention to the secretions, and by the judicious administration of the mildest medicines.

376. If by "stamina" be meant stoutness of person and fulness of blood, such stamina constitutes the very food of disease; and a person in such a state is not only more liable to febrile and epidemic attacks, but is also in much greater danger, while laboring under them, than one whose development is such as to allow all the secretory functions to be performed with ease, and whose blood is not surcharged with either natural or extraneous elements. How frequently do we hear of those who are said to be looking well and healthy, being suddenly cut off by apoplexy, or some malignant disorder! The fact is, we are deceived by appearances, and misled by what we consider the indications of health; for those whom we are taught to regard as healthy and robust, are generally the farthest from safety; and only need a slight exciting cause to bring on fatal disease. "It is not the apparent disease which is the real cause of death: but men die because the body is worn out; the tone of the fibres is destroyed, and the principle of motion fails. The obvious disease is the mask under which the condition is concealed."* Not to dwell unnecessarily on this point, I may confidently appeal to medical experience, and to some hundreds of examples.

377. Dr. William Davidson, senior physician of the Glasgow Royal Infirmary, in his treatise "On the Sources and Propagation of continued Fevers,"—as quoted in the Report of the Poor-Law Commissioners on the Sanitary Condition of the Laboring Population of Great Britain, (page 145,)—gives us the following information: "Drs. Barker and Cheyne—in their historical account of the Irish Epidemic—state that, in every part of the country, fever was reported to have been much more fatal among the upper than the lower classes! To what is this difference of mortality, so generally remarked by experienced hospital physicians, to be attributed? and which in Ireland seemed to be very remarkable; namely, in the lower classes about one in twenty-three cases, and in the upper classes one in three or four generally, but in other places about one in seven. Can the difference in the mode of living account for this anomaly? as the first live very much on potatoes, while the others use a larger or smaller proportion of animal food; and the lower classes, almost everywhere in this country, use less animal food and stimulating dishes than those who are more wealthy, and in a higher sphere of society." "It is well known that the endemic fevers of Spain and Italy are greatly more violent and rapid than

* *Journal de Médecine, Chirurgie, &c.*

those of England and Germany; and though with both Spaniards and Italians they are less violent and more manageable than when English and German residents are attacked, and are often cured by keeping the patients on water diet for several days or weeks, yet no English patient could be trusted to such a mode of management; but in order to bring the disease to a favorable termination, bloodletting to a considerable extent, and other evacuant remedies, are required. All this seems to be connected with the different habits as to the use of animal food observed by different nations."*

378. "Excessive nourishment," observes Mr. Thackrah, "is the general state of Englishmen. We take richer food than our habits require; and thus our vessels are loaded, either with blood in excess or with a fluid but partially assimilated. Hence, probably our greater danger from disease or accident; the greater bloodletting and evacuations which our maladies require; and the higher fever which injuries occasion. In reading the *Memoirs of French Surgery*, we find numerous instances of patients restored by the efforts of nature, from states which, in similar circumstances, would be fatal to Englishmen."† "It is to be remarked," says Sir G. Staunton, "that the Chinese recover from all kinds of accidents more rapidly, and with fewer symptoms of any kind of danger, than most people in Europe. The constant and quick recovery from considerable and alarming wounds, has been observed likewise to take place among the natives of Hindostan. The European surgeons have been surprised at the easy cure of sepoys in the English service, from accidents accounted extremely formidable." Sir George attributes this to their vegetable regimen.

379. A medical gentleman recently informed me, that four individuals in Manchester were bitten by a mad dog, and were in consequence attacked by that dreadful disease, hydrophobia. Similar remedies were employed in each case; death, however, terminated the sufferings of all except one; and he had long subsisted on a vegetable diet. An isolated case of this kind, however, should have little weight with us, as the recovery may have depended upon some cause unknown to us.

380. Some there are who, though convinced of the propriety of a vegetable diet for those who are strong and well, think its adoption a dangerous experiment for those who are weak or emaciated by disease; but Dr. Cheyne was of a very different opinion. He says: "For those who are extremely broken down with chronic disease, I have found no other relief than a total abstinence from all animal food, and from all sorts of strong

* *Edinburgh Medical and Surgical Journal*, No. 166.

† "Lectures on Digestion and Diet," p. 84.

and fermented liquors. In about thirty years' practice, in which I have (in some degree or other) advised this method in proper cases, I have had but two cases in whose total recovery I have been mistaken; and they were both too deeply diseased, and too far gone for recovery, before I undertook them." The author is acquainted with several persons who had long labored under extreme weakness and debility, notwithstanding a long trial of a stimulating diet,—of animal food, porter, wine, &c.,—at the recommendation of eminent practitioners; and yet, after adopting a simple, nourishing diet,—consisting of rice and other farinaceous substances, they immediately began to acquire strength, and were gradually restored to health.

381. Under a stimulating diet, weak persons may seem to rally; and doubtless many, whose constitutions are able to bear it, rapidly improve; but with many others, this does not continue long; they generally retrograde; some debilitated organ or other of their system being found inadequate to the duty required of it; while, under a mild and natural diet, tone is gradually imparted to each organ; the functions are performed with ease and advantage; and the whole frame assumes its normal state of health, strength, and activity. Unfortunately, many have neither faith nor patience to give a fair trial to this slow but more sure process.

382. The following is a case in point, from Dr. Lambe's Reports: A youth employed as a shopman was obliged, at an early period, to live on vegetables: his health was not robust. At the age of sixteen, his diet contained a considerable proportion of animal food. "The consequence was, that he improved considerably in strength and appearance; and, as he expresses it, he thought himself becoming quite a hearty lad. This increased strength, and apparently improved health, lasted nearly two years. After this, it began to decline. Though the diet continued unchanged, the strength diminished; and he is certain that now, at the age of twenty-one, he is not so strong as he was three years ago,—at eighteen. He is not now able to raise weights which he could do then." At the age of eighteen, moreover, he became affected with scrofula.

383. An intelligent gentleman thus writes respecting his little boy: "He was, for a long time, delicate and ill; and, at the suggestion of the medical attendant, we ceased to give him animal food: he very soon became quite hearty, and seemed to relish bread and butter as his most desirable fare. The extremely pernicious effects of animal food in illness show that it cannot be so generally suited to us as farinaceous food, which is found to agree with persons in almost every state of health." Many more instances might be given of the beneficial effects of a fruit and farina.

ceous diet on persons laboring under disease, but it is presumed that those already presented will be sufficient to convince those who are sceptical on the subject ; and, having shown that it is equally favorable to the continued maintenance of health, strength, and soundness of constitution, a few examples may now be adduced, to demonstrate its efficacy as a protection against diseases, and more especially such as are of an epidemic character.

CHAPTER IX.

VEGETABLE DIET PROTECTIVE AGAINST EPIDEMICS.

384. FROM Volney's *Travels* we learn, "the Wallachians are in general tall, well built, robust, and of a very wholesome complexion. Diseases are very rare among them ; and the plague, though so frequent in Turkey, has never been known, excepting in times of war, when this disease is brought among them by the troops who come from Asia. The manners of the Wallachians, as far as I have been able to judge of them, are simple, and neither embellished nor sullied by art. Temperate in their repasts, they prefer vegetables to fruits, and fruits to the most delicate meats." Timoni, in his account of the plague at Constantinople, relates that the Armenians, who chiefly live on vegetables, are far less liable to the disease than the inhabitants of that city.*

385. Sir William Temple, in his "Essay on Learning,"† says of the Brahmins : "Their moral philosophy consisted chiefly in preventing all diseases or distempers of the body, from which they esteemed the perturbation of mind, in a great measure, to arise ; then in composing the mind, and exempting it from all anxious cares ; esteeming the troublesome and solicitous thoughts about past and future to be like so many dreams, and no more to be regarded. They despised both life and death, pleasure and pain ; or, at least, thought them perfectly indifferent. Their justice was exact and exemplary ; their temperance so great, that they lived upon rice and herbs, and upon nothing that had sensitive life. If they fell sick, they counted it such a mark of intemperance, that they would frequently die of shame and sullenness ; but many lived a hundred and fifty, and some two hundred years."

* Clutterbuck on Fever.

† Works, vol. II., p. 149.

386. In the first missionary voyage to the South Sea Islands, we are told that, "until the Europeans visited the Otaheitans, they had few disorders among them. Their temperate and regular mode of life, the great use of vegetables, little animal food, and absence of all noxious distilled spirits and wines, preserved them in health." The case at present is woefully different.

387. It has been observed, that the laboring negroes of the West India Islands are almost wholly exempt from the scourge of the yellow fever, which has cut off such numbers of the other classes of the residents. Upon this observation it was proposed, when the same disease invaded Philadelphia, and was thought contagious, to employ negroes to attend the sick. But there it was found that negroes were some of those who were the most subject to the disease. The principal cause of this difference is said, by the physician on whose authority I relate the fact, to be, that in Philadelphia the manner of living of negroes was as plentiful as that of white people in the West Indies; the reverse of which is known to be the fact in the islands."*

388. Humboldt says the Mexican Indians escape the goitre, even in districts where it is prevalent. It is probable that their exemption from bronchocele is due to their subsisting on vegetables; on which account there will be less occasion for their drinking the water of the country, upon which the disease is supposed to depend.

389. The late Dr. Alderson, of Hull, sent the following statement to Mr. Thackrah: "A friend has, for a long series of years, uniformly continued a plan of water-drinking and a vegetable diet, which he adopted on mature reflection; being fully convinced that the contrary mode was mere luxury and indulgence. His children are living evidences of the good effects of such a plan; there cannot be a handsomer, stronger, or better family; they possess every physical power in perfection—being tall, comely, finely proportioned, patient of fatigue, capable of the greatest exertions, and excelling in every gymnastic exercise, without ever having tasted animal food, or fermented liquors. They have very seldom even required the aid of medical men; they fear not the effects of the common epidemics; nor have they ever suffered from acquired diseases."†

390. The Rev. J. B. Stretches, from whose letter I have previously given an extract, (302,) further says: "As far as my experience with respect to the members of our Society goes, they are far less subject to the period-

* Bush's Works, vol. iv., p. 55.

† Thackrah's Lectures on Digestion and Diet, p. 102.

ically prevailing epidemics ; and, during the late destructive cholera and influenza, none of them were at all affected by those diseases."

The following cases are quoted from Sylvester Graham's "Lectures on Human Life :"

391. Howard, the celebrated philanthropist, was probably more exposed to the influence of pestilential causes than any other human being that ever lived. "In the period of sixteen or seventeen years," says his biographer, "he travelled between fifty and sixty thousand miles, for the sole purpose of relieving the distresses of the most wretched of the human race. The fatigues, the dangers, the privations he underwent or encountered, for the good of others, were such as no one else was ever exposed to in such a cause, and such as few could have endured. He often travelled several nights and days in succession, without stopping, over roads almost impassable, in weather the most inclement, with accommodations the meanest and most wretched. Summer and winter, heat and cold, rain and snow, in all their extremes, alike failed to stay him for a moment in his course ; while plague and pestilence and famine, instead of being evils that he shunned, were those with which he was most familiar, and to many of whose horrors he voluntarily exposed himself ; visiting the foulest dungeons, filled with malignant infection ; spending forty days in a filthy and infected lazaretto ; plunging into military encampments where the plague was committing its most horrid ravages, and visiting where none of his conductors dared to accompany him." Through all this he subsisted entirely on a most rigidly abstemious diet ; carefully avoiding the use of wine, and all other alcoholic drinks ; and such was the result of this man's experience and observation, that he earnestly advised others who were exposed to the plague to abstain entirely from the use of animal food : this it cannot be supposed he would have done, had he not been fully confident of the correctness of such advice, both from what he had experienced himself, and from what he had seen in others. And it must be remembered, that Howard's opportunity to test the correctness of this opinion was neither brief nor limited, but the most extensive, varied, and long-during, ever experienced by any one man ; and such were the accuracy of his observations, and the soundness of his judgment, that, although not himself a physician, he was more successful in treating the plague than any of the physicians where he went. Howard's opinion on such a subject is therefore of the highest value. "The abstemious diet which at an early period of his life he adopted, from a regard to his health," says his biographer, "he afterwards continued and increased in its rigor, from principle and from choice, as well as from a conviction of the great advantages which he derived from it." And, after all his

experience, near the close of his life, he made the following record in his diary : " I am fully persuaded, as to the health of our bodies, that herbs and fruits will sustain nature, in every respect, far beyond the best flesh."

392. The distinguished botanist, Charles Whitlaw, speaking of the ravages of the yellow fever in New York, says : " I was then in full vigor of health, having been brought up on a vegetable diet, which, I have no doubt, was the chief cause of preserving my health and life, as I attended and nursed a considerable number, during the whole of their illness, without taking the fever. Being anxious to know the cause of the dreadful malady, I attended the dissections. The doctors were astonished how I escaped the contagion. Mr. Hardy, a Scotch philanthropist, like Howard, went from place to place in the city, administering comforts to the diseased and miserable. I was induced to follow his course. It would be impossible to describe the distress I witnessed." Mr. Whitlaw also informed Mr. Graham that he spent a season in New Orleans, during the prevalence of the yellow fever, and was much among the sick, nursing and administering to them ; and, by virtue of a pure vegetable diet, he wholly escaped an attack of fever.

393. Dr. Copeland says : " When travelling in the most unhealthy parts of intertropical Africa, in 1817, I met with an Englishman who had lived there between thirty and forty years, and was then in the enjoyment of good health. The circumstance was singular ; and, in answer to my inquiries as to his habits, he informed me that, soon after his removal to that pestilential climate, his health had continued to suffer till, after trying various methods without benefit, he had pursued, as closely as possible, the modes of life of the natives—adopting both their diet and beverage, (rice, maize, and water,) and from that time he had experienced no serious illness." " Dr. Rush, it is well known, preserved his health and energy amidst a very fatal yellow fever epidemic of Philadelphia, by confining himself to diet consisting chiefly of vegetables, grains, and milk, and excluding the flesh of animals in every shape."*

394. The Rev. Mr. Mylne, missionary to Africa, makes the following mention of the health of his colleague, the Rev. Mr. Crocker. Having given an account of his own severe sickness and recovery, he adds : " Brother Crocker has been very much favored. He has had no real attack of fever, all this time ; which, I suppose, is unprecedented for a white man here : but he began, three months before leaving America, to live on farinaceous food, and has strictly adhered to his principles since he arrived ; living on rice, cassada, sweet potatoes, &c. : a fact worthy of the

* *Edinburgh Medical and Surgical Journal*, No. 166.

consideration of emigrants to this country." Mr. G. W. McElroy, of Kentucky, visited Liberia, (in Africa,) in the summer of 1835; arriving in July. He spent two months in Monrovia, and two months on the coast. During his voyage to Africa, while there, and on his passage home, he abstained wholly from animal food; living on rice and other farinaceous vegetables, and on fruits. He enjoyed the best of health the whole time, (although much exposed while in Africa;) and in fifty-seven days he gained fifteen pounds in weight.

392. "But the most signal demonstration of the truth of the principles which I am contending for," says Mr. Graham, "was afforded in the city of New York, during the prevalence of the cholera, in the summer of 1832. The opinion had been imported from Europe, and generally received in our country, that a generous diet—embracing a large proportion of flesh-meat, flesh-soups, &c., with a little good wine—and a strict abstinence from most fruits and vegetables, were the very best means to escape an attack of that terrible disease. Nearly four months before the cholera appeared in New York, I gave a public lecture on the subject, in that city; in which I contended that an entire abstinence from flesh-meat and flesh-soups, and from all alcoholic and narcotic liquors and substances, and from every kind of purely stimulating substances, and the observance of a correct general regimen in regard to sleeping, bathing, clothing, exercise, &c., would constitute the surest means by which any one could rationally hope to be preserved from an attack of that disease. I repeated this lecture, after the cholera had commenced its ravages in the city; and, notwithstanding the powerful opposition to the opinions which I advanced, a very considerable number of citizens strictly adhered to my advice. And it is an important fact, that of all who followed the prescribed regimen uniformly and consistently, not one fell a victim to that fearful disease, and very few had the slightest symptoms of an attack. The following statements, which were received from respectable individuals soon after the disease had disappeared from the city, may be relied on with the fullest confidence:

396. "In stating my views of a simple diet," says Dr. Amos Pollard, "as a means of preserving health and preventing disease, I must necessarily be brief, for want of time. I think I have the most ample evidence of its salutary and conservative effects in my own person. I had been afflicted, both before and during my medical studies, with the worst of diseases—chronic dyspepsia—from which I never obtained any permanent relief until about eighteen months since, when I put myself on the simple mode of living recommended in your lectures. For nearly a year, I sub-

sisted principally upon coarse wheat-meal bread and milk, with great advantage to my health; when, happening to get some milk which tasted and smelt of garlicks, I became so disgusted with it that, in May last, (1832,) I exchanged my milk for spring water, which, with the coarse bread, has constituted my diet mainly ever since. During the past summer, and especially the cholera season, my professional duties were exceedingly arduous; and I often felt myself nearly worn out, for want of rest and sleep. Yet, through the whole sickness, I subsisted on one pound per day of coarse, unleavened, wheat-meal crackers, with some fruit and spring water, and experienced no disorders of the stomach or bowels, but enjoyed, and still continue to enjoy, far better health than I have experienced before for the last fifteen years. I also gained several pounds in weight during the cholera season. Many people, and among them, some of my own profession, have asserted that simple vegetable diet is conducive to, and in many cases has actually produced, cholera. Both in hospital and private practice, I have taken considerable pains to investigate these matters, and in not a single instance have I been able to verify their assertions; but, on the contrary, I have uniformly found, that every person who has strictly and judiciously observed such a diet, under a well-regulated general regimen, has not only escaped the cholera, but enjoyed excellent general health.”*

397. Dr. D. M. Rees—whose practice and success were at least equal to any other physician's in New York—declares, that when the cholera broke out in that city, (and he was called to practise among it,) he found that the disease was making its greatest ravages among the excessive flesh-eaters: and he, consequently, went home and requested his family to abstain entirely from the use of flesh during the continuance of the epidemic in the city; and he and his family subsisted wholly on a vegetable and milk diet while the cholera prevailed, without having any thing of the disease, except in one instance, near the close of the sickness, when Mrs. R., without his knowledge, partook of flesh-meat, and, in a few hours after, was taken with diarrhoea. Precisely the same thing happened to Mr. Henry R. Piercy and his wife: and Dr. Rees says, that all who conformed strictly to his advice wholly escaped the disease.

398. “Dr. Tappan, who superintended the Park Hospital, has assured me,” says Mr. Graham, “that out of twelve house-pupils (students of medicine and young physicians) who assisted him in the hospital during the prevalence of the cholera, Mr. Sharrock, who had lived more than a year very strictly on a simple vegetable diet, was the only one who entirely

* Graham's Lectures, vol. II., p. 247.

escaped all symptoms of the disease; all the others being attacked more or less violently, and some quite severely." Mr. Graham gives a great many more instances of persons who enjoyed good health, and were protected from the cholera, while they lived upon a purely vegetable diet; and this mode of living has made such rapid progress in several parts of the United States, that Graham Houses (that is, hotels where neither animal food nor fermented liquors are provided) are as common as Temperance Coffee Houses in this country.

399. The observations of the poet Shelley may aptly conclude this portion of the subject: "There is no disease, bodily or mental, which the adoption of vegetable diet and pure water has not infallibly mitigated, wherever the experiment has been fairly tried. Debility is gradually converted into strength; disease into healthfulness; madness, in all its hideous variety—from the ravings of the fettered maniac to the unaccountable irrationalities of ill-temper that make a hell of domestic life—into a calm and considerate evenness of temper, that alone might offer a certain pledge of the future moral reformation of society. On a natural system of diet, old age would be our last and our only malady; the term of our existence would be protracted; we should enjoy life, and no longer preclude others from the enjoyment of it; all sensational delights would be infinitely more exquisite and perfect; the very sense of being would then be a continued pleasure—such as we now feel it in some few and favored moments of our youth. By all that is sacred in our hopes for the human race, I conjure those who love happiness and truth, to give a fair trial to the vegetable system. Reasoning is surely superfluous on a subject whose merits an experience of six months would set at rest for ever. But it is only among the enlightened and benevolent that so great a sacrifice of appetite and prejudice can be expected; even though its ultimate excellence should not admit of dispute. It is found easier, by the short-sighted victims of disease, to palliate their torments by medicine, than prevent them by regimen. The vulgar, of all ranks, are invariably sensual and indocile; yet I cannot but feel persuaded that, when the benefits of vegetable diet are mathematically proved—when it is as clear that those who live naturally are exempt from premature death, as that one is not nine—the most sottish of mankind will feel a preference towards a long and tranquil, contrasted with a short and painful life."

CHAPTER X.

VEGETABLE DIET CONDUCTIVE TO SYMMETRY AND NORMAL DEVELOPMENT
OF THE HUMAN FRAME.

400. THERE are so many causes influencing the development of the human frame, and either contributing to or preventing its approximation to an ideal type of perfect symmetry and beauty, that I shall not attempt here to enumerate them. There cannot be a doubt, however, that, after birth, food has a very considerable influence. It has been shown that all animal bodies are in a state of constant mutation; millions of atoms are daily separating from our corporeal frame; and their place is supplied by newly organized matter, received from our food. Air, exercise, and many other circumstances, will, of course, materially influence the changes constantly taking place; but, all other things being equal, the more natural and appropriate the food, the more complete and normal will be the development. The lower ranks of creation supply us with many instances of the influence of food over development.

401. "If bees are deprived of their queen, and are supplied with comb containing young worker-brood only, they will select one or more to be educated as queens; which, by having a royal cell erected for their habitation, and being fed with royal jelly for not more than two days, when they emerge from the pupa state (though, if they had remained in the cells which they originally inhabited, they would have turned out workers) will come forth complete queens, with their form, instincts, and powers of generation entirely different. Thus can a larger and warmer house, (for the royal cells are affirmed to enjoy a higher temperature than those of the other bees,) a different and more pungent kind of food, and a vertical instead of a horizontal posture, in the first place, gave a bee a differently shaped tongue and mandibles; render the surface of its posterior tibiae flat instead of concave; deprive them of the fringe of hairs that forms the basket for carrying the masses of pollen; of the auricle and pecten which enable the workers to use these tibiae as pincers; and of the brush that lines the inside of the plantæ. They lengthen its abdomen; alter its color and clothing; give a curve to its sting; deprive it of its wax-pockets, and of the vessels for secreting that substance; and render its ovaries more conspicuous, and capable of yielding female as well as male eggs. These seemingly trivial circumstances, just enumerated, altogether alter

the instincts of these creatures. They give to one description of animals address and industry; and to the other astonishing fecundity. They change the very passions, tempers, and manners. The very same foetus, if fed with more pungent food, in a higher temperature and in a vertical position, becomes a female destined to enjoy love, to burn with jealousy and anger, to be incited to vengeance, and to pass her time without labor; whereas this very same foetus, if fed with more simple food, in a lower temperature, in a more confined and horizontal habitation, comes forth a *worker*, jealous for the good of the community, a defender of the public rights, enjoying an immunity from the stimulus of sexual appetite; laborious, industrious, patient, ingenious, skilful; incessantly engaged in the nurture of the young; in collecting honey and pollen; in elaborating wax; in constructing cells and the like; paying the most respectful and assiduous attention to objects which, had its ovaries been developed, it would have hated, and pursued with the most vindictive fury till it had destroyed them!" *

402. The organs connected with digestion are the most readily influenced by a change of food; but all the other organs and functions are more or less affected by it. According to Sir Eyerard Home,† the digastric muscle in birds of prey is so small as not to be easily detected; but if a bird of this kind be compelled to live on grain, the muscle becomes so large that it could not be recognized as belonging to a bird of prey. Mr. Hunter kept a seagull for a year upon grain, and found the strength of the muscle very much augmented. The South American ostrich is the native of a more productive soil than the African ostrich; the consequence is, that the gastric glands of the former are less complex and numerous than those of the latter, and the tritulating organ is less developed.‡

403. We have also many accounts of remarkable changes produced upon other animals, as well as upon human beings, by a change of diet; for in proportion as the food is more or less nutritious, and more or less stimulating, in the same proportion will each organ of the body, as well as each particle of that organ, vary. If sufficiently nutritious diet be not given to the young, normal development is arrested; and if food of too stimulating a nature be supplied, all the processes of assimilation and growth are hurried on too rapidly; certain portions of the body receive prematurely their full growth, while others are retarded; the body, therefore, as a whole, is either imperfect or deformed. "Animal food—possessing a greater proportion of stimulating power to its quantity of nutrient

* Kirby and Spence's Introduction to Entomology, vol. II., p. 129, &c.

† Lectures on Comparative Anatomy, vol. I., p. 271.

‡ Ibid., vol. I., p. 293.

matter—more rapidly exhausts the vital properties, and wastes the substance of the organs; it accelerates all the functions of the system; and renders the vital changes less complete, and the general results of the vital economy less perfect. There is no law of organic life, extending over the whole animal and vegetable kingdoms, which is more general and more certain than this. The slower the growth of organic bodies, consistently with the perfectly healthy and vigorous condition and action of the vital powers, the more complete are the vital processes, and the more perfect and symmetrical is the general development. Indeed, this law, or one very analogous to it, extends throughout the material world, and governs the formation of all material bodies. Even those crystals of the mineral kingdom which are formed most slowly, and, as it were, in the undisturbed tranquillity and serenity of nature, are the most perfect and the most beautiful. In the vital economy of the human body all the changes concerned in the nourishment and development of the system are the most healthfully slow and complete, when the food is purely vegetable; and it therefore must follow, from every known physiological principle in the human constitution, that—all other things being equal—a pure and well-chosen vegetable diet is most conducive to completeness of bodily development and perfectness of symmetry and beauty.*

404. When I contend that vegetable food is most conducive to this end, I do not assert that marked effects will be the immediate consequence of a change from an animal to a vegetable diet; for, as already said, the processes of decay and reproduction, though constant, are necessarily slow; nor yet do I affirm that, upon a well-chosen vegetable diet, a plain child may become an Apollo Belvidere, or a Venus de Medicis; but that a certain amelioration of form and feature will be the consequence, there is not the least reason to doubt.

405. The effects of fruit and farinacea on the bulk and weight of the human body, vary according to circumstances; such as the kind of vegetables used; the stimulants that are taken with them; the health of the individual; the comparative energy of the assimilating and excreting functions; the degree of bodily exercise, &c. Dr. Cheyne is said to have been reduced by this diet from the enormous weight of thirty-two stones to ten. (370.) Others, who have been thin and emaciated, have become much stouter by adopting it; and some have experienced no change at all. When I first commenced an exclusively vegetable diet, my weight was 12st. 8½lb.; and, during eighteen months, the only variations were one or two pounds more, and occasionally one or two pounds less. During the

* Graham's Lectures, vol. II., p. 148.

time here stated, my occupation, exercise, and mode of living, were the same as before, usually taking a moderate portion of ale, porter, wine, or other stimulants. Afterwards, all diffusible stimulants were discontinued ; in consequence of which my weight was reduced (in the course of eighteen months) to 11st. 7½lbs. Other instances which have come to my knowledge might be here introduced ; and they all appear to prove that, when an excess of fluids is not taken, a natural diet has a tendency to produce and maintain that due admixture of muscular tissue and fat which is the most consistent with normal development, and the best suited to mental and bodily activity. There is therefore no inconsistency in stating, that upon a well-regulated vegetable diet, the corpulent may become thinner and more agile, easier in their breathing, and less exposed to the numerous dangers which daily threaten and frequently destroy them ; while a shattered and emaciated frame may, under the same mild and nutritious diet, be restored to a healthy and natural state. The following facts may serve to confirm these remarks ; but they are introduced to prove the *perfect consistency* of symmetry and beauty with a vegetable diet, rather than to show the necessity for such a diet to produce such effects ; for it is equally true that many, upon a diet chiefly animal, are noted for similar qualities.

406. The Persians—who live chiefly on pilau, or boiled rice, and fruit—are acknowledged to be a race of great strength and beauty of form. “Judging from the accounts of all navigators who have visited the Friendly and Society Isles, I am inclined to think,” says a recent voyager, “that the people of Marquesas and Washington Islands excel in beauty and grandeur of form, in regularity of features and of color, all the other South Sea Islanders. The men are almost all tall, robust, and well made. We did not see a single cripple, nor deformed person ; but such general beauty and regularity of form, that it greatly excited our astonishment. Many of them might very well have been placed by the side of the most celebrated masterpieces of antiquity, and would have lost nothing by the comparison. One man (a native of Nukahiva) whom we carefully measured, corresponded perfectly, in every part, with the Apollo Belvidere. The food of these people consists of bread-fruit, cocoa-nuts, bananas, yams, batatas, &c., and mostly in a natural state.”

407. Adam Smith, in his “Wealth of Nations,” informs us, that the most beautiful women in the British dominions are said to be (the greater part of them) from the lower rank of people in Ireland, who are generally fed with potatoes. The peasantry of Lancashire and Cheshire, also, who live principally on potatoes and buttermilk, are celebrated as the handsomest race in England.

408. The interesting natives of Pitcairn's Island, who sprang from the mutineers of his Britannic Majesty's ship *Bounty*, strikingly illustrate the principles before us : "Yams constitute their principal food, either boiled, baked, or mixed with cocoanut made into cakes, and eaten with molasses extracted from the taro-root. Taro-root is no bad substitute for bread ; and bananas, plantains, and *appoi*, are wholesome and nutritive fruits. The common beverage is water ; but they make a tea from the tea-plant, flavored with ginger, and sweetened with the juice of the sugar-cane. They but seldom kill a pig ; living mostly on fruit and vegetables. With this simple diet, early rising, and taking a great deal of exercise, they are subject to few diseases ; and Captain Beechey says, they are certainly a finer and more athletic race than is usually found among the families of mankind. The young men, all born on this island, were finely formed, athletic, and handsome ; their countenances open and pleasing, indicating unruffled good-humor. Their teeth are described as beautifully white, like the finest ivory, and perfectly regular, without a single exception."

409. Humboldt informs us, that he never saw a hunchbacked Mexican Indian, and that they seem to be exempt from every species of deformity. "The Indians of Mexico, on the Tobasco river," says another very intelligent gentleman, who had resided a number of years among them, "subsist almost entirely on vegetable food : their principal article of diet is Indian corn. Those who abstain from the use of ardent spirits are muscular and strong ; and among them are to be found models for the sculptor."*

410. Many nations who feed upon flesh are noted for qualities directly opposed to these ; as the inhabitants of the Andaman Islands, who seldom exceed five feet in stature, with limbs disproportionately slender and ill-formed, together with high shoulders and large heads : their aspect is extremely uncouth. The same may be said of the Calmucks, of the natives of Van Diemen's Land, and of the New Hollanders. "The inhabitants of Northern Europe and Asia," says Professor Lawrence,† "the Laplanders, Samoides, Ostiaks, Tungoosees, Burats, and Kamtschatdales, as well as the Esquimaux in the northern, and the natives of Terra del Fuego in the southern extremity of America, are the smallest, weakest and least brave people of the globe, although they live almost entirely on flesh, and that often raw."

411. The Indians of Patagonia, and of the great Pampas or plains of South America, seem to form the most remarkable exception to the general rule with regard to flesh-eating tribes and nations. The earliest accounts

* Graham's Lectures, vol. II., p. 166.

† Lectures, vol. II., p. 186.

which we have of the Patagonians, describe them as almost a race of giants; some of them measuring ten or eleven feet, and being, on an average, much taller than any other known portion of the human family, and every way well proportioned. These accounts, however, seem to have been greatly exaggerated. Bougainville, in 1767, landed amongst the Patagonians. Of their size he remarks: "They have a fine shape: among those whom we saw, not one was below five feet ten inches and a quarter, (English,) nor above six feet two inches and a half in height. Their gigantic appearance arises from their prodigiously broad shoulders, the size of their heads, and the thickness of all their limbs. They are robust and well fed: their nerves are braced, and their muscles strong, &c." Wallis, who visited them shortly afterwards, says: "The stature of the greatest part of them was from five feet ten inches to six feet." Captain King, who visited them in 1827, gives precisely the same dimensions; but says: "It is possible that the preceding generation may have been a larger race of people; for none that we saw could have been alive at the time of Wallis's or Byron's voyage." Messrs. Armes and Coan, the American missionaries, who have recently spent three months among them, state that the present inhabitants of Patagonia fall very considerably short of the descriptions given of their ancestors, some two or three hundred years back; "the tallest of them not exceeding six feet two inches in height, and few of them reaching this. They are evidently," says Mr. Armes, "a degraded race of men; and are still becoming more degenerated."

412. Sylvester Graham says: "If any dependence can be placed on the opinions of those who have written and testified concerning this people, the Patagonians originally sprang from a race of islanders of very great bodily size and harmony of proportions, and who were strictly vegetable-eaters. If this is true, it would naturally require a succession of several generations, under the most unfavorable circumstances and diet of savage life, to degenerate the race to the diminished size of other flesh-eating tribes." They live in an exceedingly mild and uniform climate; the atmosphere is dry and salubrious, and they take a great deal of exercise in the open air; all which circumstances are favorable to their physical development.

413. The size, symmetry, and beauty of form, in nations and individuals, are modified by so great a variety of circumstances—such as climate, air, occupation, &c.,—that no indubitable evidence, as to the influence of food in producing these qualities, can be obtained by a mere reference to history and experience; yet the examples they afford us are sufficiently clear and numerous to confirm our physiological deductions.

CHAPTER XI.

VEGETABLE DIET CONDUCTIVE TO THE ACUTENESS AND PERFECTION OF THE
ORGANS OF SPECIAL SENSE.

414. WE must not, however, rest contented with comparing the respective influence of an animal and a vegetable diet upon the nervous power, or the mere organic life of man: we have further to consider him as a sentient, intellectual, and moral being; and to discover which kind of food is best adapted to develop his sensorial power, and the more important and more excellent part of his nature. A man may possess a sound body, along with great muscular force, and yet know little of the refined pleasures of sense, and still less of the intellectual, sympathetic, moral and religious pleasures in which man's highest happiness consists. We have already seen, that all the organs of special sense, except hearing, have a direct relation to the natural food of each animal: we may therefore safely conclude, that those organs will be best developed, and their functions best executed, by a strict adherence to that diet for which the structure is specially adapted; and that all substances which contain a greater amount of stimulation than necessary, will tend to deteriorate the functions of those organs.

415. Mr. Graham says: * "It has been a matter of very frequent and extensive observation, that those who, having been always accustomed to the use of flesh-meat, abandon it entirely, and subsist on a plain and simple vegetable diet, experience a very great improvement in their special senses. I have seen many such instances within the last six or seven years; and some of them of a very marked character. This improvement, however, is generally perceived much sooner in the smell and taste than in the sight and hearing; and, in some cases, the sudden substitution of a less for a more stimulating diet, will cause a temporary depression of the physiological powers and functions of the system, and especially those appertaining to organic life; and while this depression, or species of indirect debility, continues, the special senses, and particularly sight and hearing, are often, to a considerable extent, involved in a general effect, and their functional powers are commensurately diminished; in consequence, however, of a relaxation of the anatomical mechanism of the organs, rather than an abatement of

* Lectures, vol. II., p. 299.

the sensorial power : but as soon as the vital properties of the body become perfectly adapted to the character of the new diet, the general tone of the system is elevated, and the functional powers of the special senses greatly improved ; provided always, that the vegetable diet is of a proper kind and condition, and the individual is not intemperate in quantity, nor improper in his regimen and habits in any other respect ; for every species of excess is necessarily injurious to the special senses, and none more so than gluttony and licentiousness." Dr. Lambe, who paid great attention to the subject, and noted the effects of a vegetable diet in a great variety of cases, confidently states, that "not only are the special senses improved by the disuse of flesh, but this improvement pervades every organ, and influences every function of every part of the system. Observation shows that there is no organ of the body which, under the use of vegetable food, does not receive a healthy increase of its peculiar sensibility, or that power which is imparted to it by the nervous system."

416. These remarks were strikingly illustrated in the person of Caspar Hauser, previously mentioned, (132,) who is supposed to have been confined in a narrow, dark dungeon from early childhood to the age of seventeen, when he was released, and was found at the gates of Nuremberg, on the 26th of May, 1828. During the whole time of his confinement, he subsisted on coarse brown bread and water exclusively, and for a long time after he was found he possessed considerable acuteness and power of sight, hearing, smell, taste, and touch. "It has been proved, by experiments carefully made," says his learned biographer, "that in a perfectly dark night he could distinguish different dark colors, such as blue and green, from each other. He could walk anywhere as well in the dark as in the light, and was astonished to see others groping and stumbling along in the dark. When, at the commencement of twilight, a common eye could not distinguish more than three or four stars in the sky, he could already discern the different groups of stars, and could distinguish the different single stars of which they were composed from each other, according to their magnitude and the peculiarities of their colored light."

417. Much of this ability to distinguish objects and colors in the dark was undoubtedly owing to his eyes having been long accustomed to deprivation of light : he consequently experienced great inconvenience, at first, from the full light of day ; but, as his eyes became gradually more used to the light, his power and distinctness of vision did not diminish, and he became as remarkable for these properties by day as he had previously been by night, and could distinctly see small objects far beyond the reach of ordinary vision. "His sight," says his biographer, "was as sharp in

distinguishing objects near, as it was penetrating in discerning them at a distance. In dissecting plants, he noticed subtle distinctions and delicate particles which had entirely escaped the observation of others." His senses of hearing, smell, taste, and touch, were equally remarkable; as the following extracts from his biography attest:

418' "His hearing was scarcely less acute than his sight. When walking in the fields, he once heard, at a distance comparatively great, the footsteps of several persons; and he could distinguish these persons from each other by their walk." He could distinguish apple, pear, and plum trees from each other, at a considerable distance, by the smell of their leaves. After he had become accustomed to eating flesh, he could no longer distinguish sounds with so great a nicety as before; and there can be little doubt, from the testimony of his biographer, that his change of diet considerably diminished the acuteness of all his senses. Many other examples might be given, if necessary, to prove the great influence which a natural diet has in perfecting the organs of special sense; and instances are not uncommon of persons experiencing a great exaltation of the senses, after discontinuing a flesh diet, to which they had been long accustomed, and adopting a plain, simple, and nutritious vegetable diet. This improvement, however, cannot be expected to take place suddenly after the change; nay, the first effects might perhaps be a diminution of sensibility, particularly of sight and hearing, until the system became used to the less stimulating diet—as was shown to be the case with regard to corporeal strength, (255:) but in neither case is there any real loss of power—as a little time and patience will sufficiently testify.

CHAPTER XII.

VEGETABLE DIET CONDUCTIVE TO REAL SENSUAL PLEASURE AND ENJOYMENT.

"So that the pains of poverty are removed, simple fare can give a relish equal to the most expensive luxuries."—*EPICURUS*.

419. THE prevalent notion that vegetable diet requires the continual exercise of self-denial, and considerably diminishes the pleasures arising from the gratification of the palate, is with many persons the most weighty

objection to its adoption. This notion, however, is decidedly erroneous, and not one fact can be brought to support it. Under a fruit and farinaceous diet, the organs of smell and taste become much more sensitive, and the sensations resulting from the gratification of a natural appetite upon this food are much more exquisite and refined, and much more constant, than can possibly be experienced on an animal or mixed diet, which requires great variety, continual changes, and many additions from the vegetable world, to prevent disgust. I do not assert that the vegetable-eater looks forward with such anxious cravings to an expected meal as the *bon vivant*, who has, perhaps, been under the necessity of rousing the appetite of an already surfeited system by bitters and stimulants; this would be to withdraw his attention from higher and more worthy pursuits, and to convert the supreme enjoyment of a moral and intellectual being into the inferior pleasures of the sensualist.

420. The man who has long habituated himself to that food which is best adapted to his organization and instincts, can, during many hours, pursue his mental and bodily avocations without fatigue, and without having his attention withdrawn from higher objects of interest by any gnawing or painful craving for food, and without having his reflections disturbed by the prospective pleasures of the table. When the hour of refreshment arrives, he can defer the gratification of his appetite with much less inconvenience than one who lives on a more stimulating diet; but when he does sit down to his healthy repast, he eats with a zest which a natural appetite only can impart; and upon the most simple preparations of fruits, roots, rite, and other farinaceous articles, he experiences a pleasure far more exquisite than the richest and most varied dishes can yield to the man who indulges a perverted appetite. It is true, that some who have but lately adopted a vegetable diet, meet with many tempting dishes of animal food, of which they find it difficult to deny themselves; and to persevere, requires a firm resolution, and a mind well convinced of the advantages to be derived from the change; but when time has familiarized the organs to more simple preparations, and the mind has been fully satisfied as to the propriety of the change and the benefits resulting from it, the former dishes will become more offensive than pleasing, and the perfumes arising from them will only increase the disrelish for them. Since my commencement of vegetable regimen, I have several times partaken of animal food again, for the purpose of making observations on the change effected by diet on the secretions, &c., and always had considerable difficulty in overcoming the disgust which the taste of flesh at first excited. The pulse was accelerated, the breathing became more rapid, the temper more irritable, the

mind less collected, and the feelings generally less comfortable. In the course of two or three days the antipathy was overcome, and the other bad effects gradually subsided, but not entirely; and I always returned to a more simple and more natural diet with great pleasure, as upon it my enjoyment was much more complete. "It is generally supposed," says Dr. Alcott, "that he who confines himself to a simple diet soon brings his stomach into such a state, that the slightest departure from his usual habits, for once only, produces serious inconveniences; and this, indeed, is urged as an argument against simplicity itself. Yes, how strange! How much more natural to suppose that the more perfect the health of the stomach, the better it will bear for a time with slight or even serious departures from truth and nature! How much more natural to suppose that perfect health is the very best defence against all the causes which tend to invite or to provoke disease! And what it would be natural to infer, is proved by experience to be strictly true. The thorough-going vegetable-eater can make a meal for once, or perhaps feed for a day or so, on substances which would almost kill many others; and can do so with comparative impunity."

421. But how are people to be convinced of the truth of these observations? The testimony of others can have little influence on the minds of those whose only experience is on one side of the question, or who have but casually tried a less stimulating diet. They think it impossible that articles which they find so insipid should yield so much pleasure as others profess to derive from them; and, therefore, deem it unnecessary to give the subject any further consideration. Thus are they insensibly led to believe their own mode of enjoyment the best, and to pity or ridicule those who are happy and contented with a simpler fare than their own. (138.) But the physiological inquirer will easily detect and expose the error here involved. Whatever our present habits may be, it is indubitably true that the purest and most satisfactory gratification of the palate is produced by those alimentary substances which stimulate the organs no more than is consistent with the healthy discharge of their functions, and which have a direct relation to the whole of the human economy. Even in a raw, or unprepared state, these substances are capable of yielding great satisfaction to a natural appetite; and if half the attention were paid to cooking, preserving, and otherwise preparing the innumerable varieties of fruits, roots, grain, &c., which is now almost exclusively devoted to similar operations on the flesh of various animals, with what an immense profusion of nutritious and agreeable food would the vegetable world then supply us!

422. But the prevailing customs and habits of the present age, in

England, are such that, both at public and private tables, almost every vegetable preparation is spoiled by admixtures of animal matter, in one shape or other ; even plum-puddings must be polluted by an abundance of suet, and the pastry defiled by kneading with lard and other kinds of fat, which to the real Pythagorean must be exceedingly disagreeable. It is well for him, however, that his taste has become so natural as to be gratified with the simplest fare ; so that he has no great cause to regret if, at a friendly feast, no special regard has been paid to his peculiarities. But there can be little doubt that, as more correct notions respecting diet prevail, the gentler sex will exert their influence in effecting a change ; or, at any rate, in providing suitable dishes for those who have an utter dislike to fish, flesh, and fowl ; and to all vegetables that have been prepared with animal matter, except eggs, milk, butter, cheese, &c., to which few vegetarians object. It is generally supposed that pepper, salt, and other condiments, are more necessary to vegetable than to animal food ; whereas quite the reverse is the case ; these stimulants may assist when flesh and other improper food is taken, but for a natural diet no such articles are required. Sugar, treacle, and honey may be added, when the amount of saccharine matter is deficient ; but even salt, which is considered by many indispensable to the health both of man and animals, is decidedly injurious when taken in large quantities. All aliments contain certain portions of salt, and in these minute quantities it is salutary ; but, when taken in excess, there is reason to believe it is decomposed in the system ; and its metallic base (*sodium*) assists in forming *urate of soda*, which occurs so frequently in gout and rheumatism. (317 and 340.) In disordered states of the alimentary canal, from improper food, worms, &c., salt is an invaluable medicine, to which all animals will resort by instinct ; but, as a daily condiment to a natural diet, it cannot fail to be pernicious. It is unnecessary to advocate, at any great length, the superiority of vegetable over animal diet, in producing real sensual enjoyment ; as a few months' experience would be much more convincing than any other evidence.

CHAPTER XIII.

VEGETABLE DIET FAVORABLE TO MENTAL EXERTION AND INTELLECTUAL CULTURE.

423. THE organic structure and physiological laws which determine the natural food of man are, in general, so briefly and superficially noticed, in connection with the subject of diet, and the results of practical experience are so little known or considered, that most men think vegetable food inadequate to impart strength and vigor to the human frame; but sufficient evidence has been adduced, (Chapter IV.,) and abundant more might be had, if necessary, to prove that the opinion is unsupported, either theoretically or practically. Though many have entertained doubts on this point, there are few who do not admit the superiority of vegetable over animal food, in favoring all mental processes and intellectual labors; as well as in regulating the temper, and checking all inordinate exercise of the passions.

424. Theophrastus, the disciple of Plato and Aristotle, who died at the age of one hundred and seven, says that "eating much, and feeding upon flesh, makes the mind more dull, and drives it to the extreme of madness." Diogenes, the cynic, attributed the dulness and stupidity of the ancient athletæ to their excessive use of the flesh of swine and oxen; and the Calmucks, and other people who subsist principally or entirely on animal food, are noted for similar qualities. Sir John Sinclair observes: "Vegetable food has a happy influence on the powers of the mind; and tends to preserve delicacy of feeling, and liveliness of imagination, and an acuteness of judgment seldom enjoyed by those who make a free use of animal food. The celebrated Franklin ascertained, that a vegetable diet—promoting clearness of ideas and quickness of perception—is to be preferred by those who labor with the mind. Vegetable aliment—as never over-distending the vessels, or loading the system—never interrupts the stronger motions of the mind; while the heat, fulness, and weight of animal food, is an enemy to its vigorous efforts. Temperance, then, does not so much consist in the quantity, for that always will be regulated by our appetite, as in the quality—namely, a large proportion of vegetable aliment."*

425. "In proof of the assertion," continues Sir John, "that a vegetable

* "Code of Health," vol. 1., p. 497.

diet promotes clearness of ideas and quickness of thought, and that a transition from vegetable to animal food produces injurious effects, a friend of mine states, that he has more than once selected, from his tenants' children in Ireland, a boy remarkable for that smartness of intelligence so common in the Irish youth, while in the capacity of errand-boys on the farm, or helpers in the stables, and before they became pampered with better food than their parents' cabin afforded. The lads, at first, were lively and intelligent, and displayed a degree of shrewdness exceeding what is met with from the youth of a more elevated walk in England. But he invariably found that, in proportion as those boys became accustomed to animal food, and, according to common notions, were better fed, they relaxed in activity, and became dull and stupid; and he is confident that the change in the disposition was the effect of the change of diet; and was not owing to corruption of mind from intercourse with the other servants. In fact, they lost all their vivacity of manner, so inherent in the Irish boys, whether born in the vast bog of Allen, or in the dry and rocky mountains of Mayo and Galway. He is, therefore, inclined to think that the character of the people does not depend so much upon the climate and soil as upon food; for no part of the globe can differ more than those parts of that kingdom."

426. "These facts in relation to the Irish youth," says Mr. Graham, "are very important, and deserve far more attention from philosophers and philanthropists than has ever been given to them. The Irish peasantry, wherever they are known in the civilized world, are proverbial for their peculiar expressions, commonly called *Irish bulls*, and which are generally considered as attributable to their peculiar national stupidity, or natural *crookedness* of mind, if I may so express myself. Whereas, directly the opposite of this is true. There is probably no class of people on earth more remarkable for natural quickness and shrewdness of mind than the Irish peasantry of pure and simple habits; but they are, as a general fact, entirely destitute of the advantages of education, and, therefore, have a very limited and imperfect use and knowledge of language. The consequence is, that their intellectual quickness and activity, with their ignorance of the grammatical force and arrangement of words, continually lead them to express their ideas in a very peculiar—generally shrewd—often ludicrous—but always spirited and witty manner. Their very blunders; therefore, are really evidences of their remarkably natural quickness and activity of mind; and hence, when well educated, they are often found among the most eloquent and witty men and able writers in the world." *

* Graham's Lectures, vol. II., p. 302.

427. While Caspar Hauser (132 and 416) continued to subsist on his simple diet of bread and water, as he had done in his dungeon, "the activity of his mind," says his learned biographer, "his fervent zeal to lay hold of every thing that was new to him; his vivid, his youthfully powerful and faithfully retentive memory, were such as to astonish all who witnessed them. The curiosity, the thirst for knowledge, and the inflexible perseverance with which he fixed his attention on any thing which he was determined to learn or comprehend, surpassed every thing that can be conceived of them." After he had learned regularly to eat flesh, his mental activity was diminished; his eyes lost their brilliancy and expression; his vivid propensity to constant activity was diminished; the intense application of his mind gave way to absence and indifference; and the quickness of his apprehension was also considerably diminished.

428. In the Orphan Asylum of Albany, New York, (251,) from eighty to a hundred and thirty children were, in the close of 1833, changed from a diet which included flesh, or flesh-soup, once a day, to a pure vegetable diet, regulated by physiological principles. Three years after this change was made, the principal teacher of the Institution thus speaks of it: "The effect of the new regimen on the intellectual powers of the children has been too obvious and too striking to be doubted. There has been a great increase in their mental activity and power. The quickness and acumen of their perception, the vigor of their apprehension, and the power of their retention, daily astonish me. Indeed, they seem eager to grasp, with understanding minds, almost any subject that I am capable of presenting to them in language adapted to their years." In Ovington's "Voyage to Surat," we learn that "in their thoughts the Bannians are often more quick and nimble by their abstemious diet; which renders their spirits more pure and subtle, and thereby greatly facilitates their comprehension of things. In a word, they keep their organs clear, their spirits lively, and their constitutions free from those diseases which a grosser diet is apt to create in these warm climates."

429. "On my way to Smyrna, in Greece, in 1828," says Judge Woodruff, "I stopped at Syra, where I was detained, by contrary winds, about twenty days. I there became acquainted with Dr. Korke, an eminent teacher from Switzerland. He had the charge of the principal school at Syra, containing from two hundred to three hundred pupils. During my stay at Syra, I took great pleasure in visiting this school, which I did almost every day. I very soon began to feel and express astonishment at the remarkable vivacity, sprightliness, and mental activity and power of these children. Their memory was truly surprising. Dr. Korke assured

me that he had never, in any country, found children equal to these for clearness, sprightliness, and power of intellect, for aptitude to learn and ability to retain. And I can truly say, that these Greek children manifested a capacity for learning which exceeded any thing I had ever before or have since witnessed. Dr. Korke attributed this extraordinary ability in his pupils, mainly to their habits of living, which were extremely simple. Coarse unbolted wheat-meal bread, with figs, raisins, pomegranates, olives, and other fruit, with water, constituted their diet. Figs and other fruit composed a large proportion of their food; but I am confident they did not consume an ounce of flesh-meat in a month."

430. "I spent the winter of 1836-7 on the island of St. Croix, in the West Indies," says Mr. John Burdell, of New York, "and devoted much of my leisure time to instructing the young slaves. The little field-negro children, from five to ten years old, who never saw a letter, nor had any idea of one till I taught them, on being promised that they should have a Bible given to them if they would learn to read, would, in the course of one week, learn the alphabet, and to join a single consonant and vowel. In three or four weeks they would learn to read short sentences; such as, 'no man may put off the law of God;' and in a few months they would learn to read the New Testament. With all these little field-negroes, who lived on corn-meal, yams, peas, &c., there was the utmost avidity as well as aptitude to learn. But the little negroes of the same age in the house, living on what came from their master's table, (animal food, &c.,) are wholly different. They are totally disinclined to receive instruction, and are slow to learn, like our well-fed white children in the North.' It is an irksome task to them to apply their minds to study; and they never get a lesson, unless they are regularly tasked and urged on. I saw one of these house-children, who was twelve years old, and who had long been under the instruction of the master's daughter, and was just beginning to read a little in the New Testament."

431. "The Rev. Alden Grout," says Mr. Graham, "who has recently returned from a mission to the Zulus, on the south-east coast of Africa informs us that that people depend on the products of the soil for subsistence, living mostly on corn and milk. The children go entirely naked, and live in the simplest manner. They are sprightly, active, and full of vivacity, and their aptitude to learn is almost incredible. It is a common thing for them, in the course of fifteen months from the first time they ever saw a letter, to learn to read well in the New Testament, and to do sums in the fundamental rules of arithmetic. They all discover the greatest eagerness for knowledge; and seem to think nothing so desirable. On leaving them,

I asked what I should bring them when I returned ; they all cried out at once, 'Bring us more teachers!—more books!' " *

432. John Evelyn, after glancing (in his "Acetaria") at Cardan's opinion in favor of meat, says—"But this his learned antagonist utterly denies ; whole nations, flesh-devourers, (such as the farthest northern,) becoming heavy, dull, inactive, and much more stupid than the southern ; and such as feed much on plants are more acute, subtle, and of deeper penetration ; witness the Chaldeans, Assyrians, Egyptians, &c."

433. In reply to these observations, it may perhaps be objected, that the English and other Europeans, who live partly upon flesh, excel most nations in the arts and sciences, and have extended their dominions into every part of the known world ; while certain other people who live on vegetables are remarkable only for their imbecility and inactivity. In a candid search after truth, however, we must carefully distinguish things which are inseparably connected as cause and effect, from those which, though they coëxist, are entirely independent of each other. If intellectual greatness and mental energy depend upon a diet of animal food, why are not the Laplanders, the Tunguses, the Kamtschatdales, the Esquimaux, the Fuegians, the Patagonians, and others who live almost exclusively on animal food, the most intellectual people in the world ; and why is their political influence so circumscribed ? It is evident that a nation's greatness depends upon many influential circumstances besides food ; and the only point for which I contend is, that, all other things being equal, vegetable productions are more favorable to mental and moral culture than a diet of animal food—a position which seems fully established by the preceding evidence.

434. The Hindoos have frequently been referred to, as an instance of a nation living solely on vegetable productions, and yet devoid of that bodily and mental activity which characterize more northern nations, who live on a mixed diet. It should be recollected, however, that their political, civil, religious, and social institutions, are such as entirely preclude all enterprise, and repress all energy of body and mind ; their climate, at the same time, favoring that ease and effeminacy which their laws and customs are so calculated to produce. But, notwithstanding the physical difficulties by which the Hindoos, as a nation, are surrounded, we find among them many subsisting on a pure vegetable diet, whose intellectual endowments and acquirements would have done honor to more learned nations, whose institutions foster and promote physical and mental greatness.

435. Even in those countries which are considered the most civilized and

* Graham's Lectures, vol. I., p. 307.

enlightened, and whose inhabitants generally consume much animal food, we find many of their brightest exemplars discarding the use of flesh at their tables. Not only Pythagoras and his followers, but Menedemus, Zeno the stoic, Epicurus,* and many other philosophers of antiquity, who have been highly eulogized for purity of morals and profundity of thought, restricted themselves entirely to a diet of fruit and farinacea. Among the moderns, also, many of those who have astonished the world by their discoveries in science; who have illumined mankind by a rigorous and clear demonstration of truth; and who, by the vastness of their intellectual powers, have shed a halo of light over the physical, mental, and moral sciences, were Pythagoreans in respect to diet. Our immortal Newton, while writing his great work on Optics, lived entirely without animal food. Lord Byron excluded flesh from all his meals, though the vegetable regimen he adopted was by no means a judicious one, and was far from according with anatomical structure and physiological laws. Shelley—whose poetic power, compass of imagination, and elegant diction, have seldom, if ever, been surpassed—was both a rigid abstainer from flesh, and an able advocate of vegetable diet. Sir Richard Phillips, and some of the first-rate wranglers at our Universities, as well as many other literary and scientific characters, might be mentioned among those who, during a series of years, have lived upon fruit and farinaceous substances.

436. Many of these have adopted this mode of living, not from a conviction of its being the diet natural to man, nor from any philosophical reasoning on the subject; but because they found, by experience, that they could pursue their studies with much greater freedom and energy than when flesh formed a part of their usual meals. Their ideas were clearer; their spirits more buoyant; their attention capable of being more exclusively directed to the subject under consideration; their imagination more lively, yet under perfect control; in fact, the whole of their intellectual and sentimental powers more active, and their propensities less powerful; and, consequently, their penetration deeper, and their judgment sounder.

437. Who is there that has not experienced the difficulty of applying the mind and attention, after a full meal of animal food, to any subject requiring deep thought and research? And after what is called “a good

* The character and doctrines of Epicurus have been greatly misrepresented; and were very different from those of the modern Epicurean. The former considered that a happy life consists in tranquillity of mind and health of body; the first of which he endeavored to secure by enjoying as much of the good, and suffering as little of the evil incident to human nature, as possible; and the second he secured by extreme temperance; ἡδέα ὕδατι καὶ ἄπρῳ χρῶμενος (“feeding sweetly on bread and water.”)

dinner," do not most people find a considerable diminution of mental energy, and a disposition to sleep, rather than to bodily or mental activity; till diffusible stimulants have roused the dormant powers into an unnatural, and therefore dangerous action? None of these depressing effects are experienced by those who enjoy a more natural diet: with them, as it has been justly remarked, "it is morning all day long." Nor are the different effects of the two diets confined to these immediate impressions: they become gradually more permanent; and consequently, the whole of the mental powers are in the one case deteriorated, and in the other improved.

CHAPTER XIV.

VEGETABLE DIET FAVORABLE TO THE GOVERNMENT OF THE PASSIONS AND PROPENSITIES, AND TO THE DEVELOPMENT OF MAN'S MORAL POWERS.

438. It has been previously stated (25) that cruelty and crime marked the progress of mankind in the use of animal food; and this inference appears to be confirmed by every fact and observation that bears upon the subject. It is, however, rendered much more injurious in its effects by the craving which it universally excites for fermented liquors, and which are almost rendered indispensable, when it forms a material portion of diet. "Where animal food is used in a great proportion," says Sir John Sinclair, "fermented liquors become in a great measure necessary to obviate, in some degree, the septic tendency of such a way of living." Upon this point, certain advocates of total abstinence from fermented liquors appear to be in error; thinking it necessary to increase the quantity of animal food in their diet, in consequence of relinquishing ale, wine, and spirits. Physiology teaches us a directly contrary lesson, namely: that if fermented and distilled liquors be renounced, animal food should also be dispensed with. I have little doubt, the neglect of this rule is the cause of some constitutions being unable to carry out the principles of total abstinence; and I have been informed, by members of the Society, that after several years' abstinence from diffusible stimulants, the desire for animal food has abated. Much better would it be for their general health if—instead of taking the alarm at this indication and flying to medicines, condiments, and other substitutes for the usual stimulants—they obeyed the voice of

Nature, and entirely abandoned a diet inconsistent with a rigid observance of their rules. Animal food is undoubtedly the cause of much mischief in this respect; and so long as it shall be considered necessary to health, strength, and enjoyment, the root of the evil intemperance will not be reached. But, if the flesh of animals be discarded and a diet of fruit and farinacea adopted, the craving for intoxicating liquors, as well as the necessity for them, will vanish together.

439. As soon as divine permission was granted to Noah and his descendants to eat animal food, we read that the former "planted a vineyard: and he drank of the wine and was drunken."* When Jacob brought to his father Isaac the savory meat which he loved, we read likewise "that he brought him wine and he drank."† When Judah was called to weeping and mourning, it, on the contrary, encouraged "joy and gladness, slaying oxen, and killing sheep, eating flesh, and drinking wine."‡ Solomon was well aware of the indissoluble union existing between animal diet and the diffusible stimuli: hence his sage advice—"Be not amongst wine-bibbers; amongst riotous eaters of flesh."§ The joint influence of these two stimulants upon the passions and propensities of mankind, is universally admitted; but as the most dreadful manifestations are generally the result of inebriation, the stimulating property of the solid food is overlooked, as well as the thirst it creates for the diffusible stimulants. Various facts, however, prove to a demonstration, that feeding upon flesh has a much greater tendency than vegetable food to encourage the development and strengthen the activity of the selfish and lower propensities, and to give them a predominance over the intellectual and moral faculties.

440. In the first place, let us glance at the widely different tempers and dispositions of carnivorous and herbivorous animals: the former are savage and ferocious creatures, that generally shun the light of day, and prowl about by night, that they may the more easily kill and devour their prey; while the others wander tranquilly on the plains in herds, enjoy the light of the sun, and manifest their innocence and sociability by various playful sports and gambols with each other. Even the temper of the *carnivorous animal* may be greatly subdued, by rearing it upon a less stimulating diet; for, if the accounts received on reputable authority are to be depended upon, even the tiger, when taken very young, carefully restrained from animal food, and confined to a vegetable and milk diet, will manifest none of

* Genesis ix. 20, 21.

† Isaiah xxii. 18.

‡ Ibid. xxvii. 25.

§ Proverbs xxiii. 30.

the ferocity of its fellows ; but if it be permitted afterwards to eat flesh, it will become cruel and destructive.

441. Similar evidence is also afforded by feeding the Herbivora on animal food. Diomedes, King of Thrace, killed by Hercules, fed his mares with the flesh of miserable strangers, cut in pieces for the purpose, which made them so fierce and unmanageable that they were obliged to be kept in stalls of brass, and tied up with iron chains.* "In Norway, as well as in some parts of Hadramant and the Coromandel coasts," says Bishop Heber, "the cattle are fed upon the refuse of fish, which fattens them rapidly, but serves, at the same time, totally to change their nature, and render them unmanageably ferocious." (103.)

442. This difference of effect between a flesh and a vegetable diet upon animals, derives additional confirmation from Scripture. Isaiah—describing the period when universal harmony, benevolence, and love shall prevail on the earth—says : "The wolf and the lamb shall feed together ; and the lion shall eat straw like the bullock."† Now, though these may be regarded merely as figurative expressions, yet the prophet evidently intended to point out the relation which existed between the natural food of the lion and a ferocious disposition, and the gentleness resulting from vegetable aliment. In general, also, those nations and individuals who indulge much in flesh-meat are more licentious, ferocious, and cruel, than those who subsist on a less stimulating diet ; and men noted for barbarity and violence have an irresistible penchant for animal food ; while those who are blessed with milder dispositions and more benevolent feelings, seem instinctively to adopt a vegetable diet.

443. "The Tartars," says Sir John Sinclair, "who live principally on animal food, possess a degree of ferocity of mind and fierceness of character which form the leading features of all carnivorous animals. On the other hand, a vegetable diet gives to the disposition, as in the Brahmin and Gentoo, a mildness of feeling directly the reverse of the former."

444. The moral influence of food upon the temper, passions, and moral feelings, seems to be admitted by all who have attentively considered the subject. Porphyry of Tyre, who lived about the middle of the third century, and was a favorite disciple of Plotinus the Platonist, was of this opinion. "Give me a man," says he, "who considers seriously whence he came, and whither he must go ; and from these considerations resolves not to be led astray or governed by his passions. And let such a man tell me whether a rich animal diet is more easily procured, or incites less to irregular passions and appetites, than a light vegetable diet. But if neither he

* Diodorus, book iv., chap. 1.

† Chap. lxx., ver. 25.

nor a physician, nor, indeed, any reasonable man whatsoever, dares to affirm this, why do we oppress ourselves with animal food? And why do we not, together with luxury and flesh-meat, throw off the encumbrances and snares which attend them? It was not from those who lived on vegetables that robbers, murderers, sycophants, or tyrants have proceeded, but from *flesh-eaters*. The necessities of life are few and easily acquired, without violating justice, liberty, or peace of mind: whereas luxury obliges those vulgar souls who take delight in it, to covet riches, to give up their liberty, to sell justice, to misspend their time, to ruin their health, and to renounce the joy of an upright conscience."

445. Lord Byron believed, that eating flesh excited men to war and bloodshed; and thought

"That Pasiphaë promoted breeding cattle,
To make the Cretans bloodier in battle.

For we all know that English people are
Fed upon beef—I won't say much of beer;
Because 'tis liquor only, and (being far
From this my subject) has no business here;
We know, too, they are very fond of war—
A pleasure (like all pleasures) rather dear:
So were the Cretans; from which I infer,
That beef and battles were both owing to her."^{*}

His historian also says: "One day, as I sat opposite to him, employed, I suppose, rather earnestly over a beefsteak, after watching me for a few seconds, he said, in a grave tone of inquiry: 'Moore, don't you find eating beefsteaks makes you ferocious?'"

446. Opinions, however, are of little value upon this subject, unless supported by evidence; and many historical accounts, as well as experiments, might be given in corroboration of these views; but, as they may be found in most works on geography and general history, two or three instances may here suffice. When Homer speaks of the Lotophagi—a people who fed upon the fruit of the lotus—he seems to attribute their hospitality and good-nature to the mildness of their food:

"A hospitable race;
Not prone to ill, nor strange to foreign guest,
They eat, they drink, and nature gives the feast;
The trees around them all their fruit produce—
Lotus the name; divine, nectareous juice."[†]

Compare with this, Hesiod's description of a people whose food was of a different nature:

* Don Juan, canto II., stanzas 155 and 156.

† Pope's Homer's *Odyssey*, book ix.

"Potent in arms, and dreadful at the spear,
They live injurious, and devoid of fear;
On the crude flesh of beasts they feed alone:
Savage their nature, and their hearts of stone." *

447. In the East Indies, the Pegu clergy teach, that charity is the most sublime virtue, and, therefore, ought to be extensive enough to reach, not only to the human species, but even to animals: wherefore they neither kill nor eat any; and they are so benevolent to mankind, that they cherish all alike; making no exception on account of religion.†

448. A boy, about ten years of age, was placed under a vegetable diet by Dr. Lambe, who says: "He showed strongly in his countenance the ameliorating effects of a vegetable regimen. He had, before he adopted it, great fulness about the head; and a sternness, not to say a ferocity, of the countenance. After a certain time, the features relaxed; and he gained much more the aspect of good-humor and benevolence. It cannot be doubted, that these changes of countenance were the index of corresponding changes of the moral disposition. The regimen, however, had been persevered in three years, before they took place decidedly." (Vide § 251.)

449. St. Pierre, in his "Studies of Nature," observes: "Under an improved system of education, children will be brought up to a vegetable regimen, as being the most natural to man. As vegetable diet has a necessary connection with many virtues, and excludes no one, it must be of importance to accustom young people to it; seeing its influence is so considerable and so happy on beauty of person and tranquillity of soul. This regimen prolongs infancy, and, of consequence, the duration of human life. I have seen an instance of it," continues he, "in an English youth of fifteen, who had not the appearance of being so much as twelve. He was a most interesting figure; possessed of health the most vigorous, and of a disposition the most gentle: he performed the longest journeys on foot, and never lost temper, whatever befell him. His father, whose name was Pigot,‡ told me that he had brought him up entirely under the Pythagorean regimen; the good effects he had learned by his own experience."

450. Mr. Shillitoe, of Tottenham, a member of the Society of Friends, when about forty-five years of age, had suffered from ill health during many years, and was restored by adopting a vegetable diet, and water for drink. He lived till nearly ninety years of age, and at eighty could walk

* Cooke's Hesiod, Works and Days, book 1, 206.

† See Captain Hamilton, in Pinkerton's Coll., p. 88.

‡ Robert Pigot, Esq., formerly of Chetwynd, in Shropshire.

with ease from Tottenham to London, (six miles,) and back again. He gives the following account of himself: "It is now thirty years since I ate fish, flesh, or fowl, or took fermented liquor of any kind whatever. I find, from continued experience, that abstinence is the best medicine. I do not meddle with fermented liquors of any kind, even as medicine. I find I am capable of doing better without them. One way in which I was favored to experience help, in my willingness to abandon all these things, arose from the effect my abstinence had on my natural temper. My disposition, naturally, is very irritable. I am persuaded that ardent spirits and high living have more or less effect in tending to raise into action those evil propensities which, if given way to, 'war against the soul,' and render us displeasing to Almighty God."

451. "I know more than one instance," says Arbuthnot, "of irascible passions being much subdued by a vegetable diet." "A gentleman of sanguine constitution," observes Mr. Thackrah, of Leeds,* "who for some months took only vegetables, informed me that his temper became much less excitable. Another, of an opposite constitution, was observed, during the time he lived on *reduced* diet, to be irritable." This latter observation of Mr. T.'s I cannot permit to pass without a few remarks. All sudden changes in diet are generally attended with some little disarrangement or affection of the stomach and alimentary canal, even when the change is eventually for the better; for, as we have previously seen, (103,) habit becomes, as it were, a second nature; and the gastric juice, (81,) pancreatic fluid, &c., change their character within certain limits, according to the kind and consistency of the usual ingesta; so that if a person suddenly change from a full and highly stimulating diet to a low and meagre one, lassitude, flatulency, and even serious gastric disturbance, may be the consequence; more especially, if the change be from a solid diet of animal food to one of herbs and greens, which is what some mean by "a low vegetable diet," and which is unnatural to the human stomach, except in small quantities and along with other food. No wonder that a person feels irritable from so injudicious a change as this. It could scarcely fail to be otherwise with any one; and it was probably from this cause that Sir Walter Scott condemned "a severe vegetable diet;" having himself been affected, while under its influence, "with a *nervousness* never felt before nor since." But if a person, whatever be his constitution or temperament, gradually change from a diet of animal food to one of fruit and farinacea—including wheat, barley, rice, potatoes, &c.—I have not the least doubt of his being, in a short time, not only better in health, but in temper also,

and free from that distressing state of nervous sensibility experienced by Sir Walter Scott.

452. Fuseli, the painter, was in the habit of eating raw meat, for the purpose of engendering in his imagination horrible fancies ; and it is related of Mrs. Radcliffe, that when she was writing "The Mysteries of Udolpho," she ate uncooked meat for the same object.

453. "The fact," says Graham, "that in those tribes destitute of intellectual and moral cultivation, or in the uncivilized state, which subsist principally or entirely on pure vegetable food, the brain is more symmetrically developed, and the upper and front parts are much larger, in proportion to the lower and back parts, than in the uncivilized flesh-eaters, proves conclusively that flesh-meat increases the relative size and power of those cerebral parts which, according to phrenology, are the organs of the more exclusively selfish propensities, and tend to cause the animal to predominate over the intellectual and moral man ; while a pure vegetable diet, without neglecting to secure—by the most complete and harmonious organization, and perfect physiological endowments—all the interests of organic life and animal instinct, at the same time, naturally tends to produce that symmetry of particular and general development and harmony of parts which give comeliness and beauty to the person, and fit man, as an intellectual and moral being, to understand, and appreciate, and fulfil his duties to himself, and his relations to his fellow-creatures and his God. Hence the notorious fact that, in the perfectly rude and uncultivated state of man, the vegetable-eating tribes and nations never sink so low on the scale of humanity—never approach so near to an utter extinction of the intellectual and moral faculties—never become so deeply degraded and thoroughly truculent, as the flesh-eating tribes. However rude the state of the uncivilized vegetable-eater, he always (other things being equal) manifests more intelligence, more moral elevation, more natural grace and urbanity, than the flesh-eating savage. This fact has been observed by travellers and writers, from the days of Homer to the present time. The Patagonian may subsist wholly on flesh, with his other habits and circumstances of life, and be tolerably gentle and peaceable ; but bring him under the ten thousand exciting, and irritating, and debilitating mental, and moral, and physical causes of civic life, and he would soon find that his exclusively flesh diet was a powerful source of evil to him. Fortunately for the cause of humanity, those tribes of the human race who subsist wholly or principally on flesh cannot be prolific ; and therefore their population never becomes dense, like that of India ; nor can they procure

the means of habitual and free indulgence in the use of intoxicating substances.*

454. Few parents are aware of the immense amount of mischief they bring upon their offspring, by training them early to the use of animal food. In most instances, it is doubtless from a conviction that it will impart strength and vigor to the frame ; but its tendency is most certainly of a directly opposite character. By giving an improper stimulus to their feeble constitutions, they gradually weaken the organs of digestion, and render their children puny and sickly ; the cause of the evil not being suspected, they too frequently encourage them to take more, and even add condiments and other stimulants to excite an appetite which nature has denied. In this way the seeds of disease are unsuspectingly sown, and sooner or later will be the cause of much pain and misery. But this is not the only evil to be apprehended from this unnatural food. Those whose frames are sufficiently robust to escape immediate disease, have the animal propensities prematurely developed ; the passions and feelings are abnormally excited, and the tempers rendered irritable and imperious ; so that the moral effects are perhaps more to be dreaded than the physical. All who pay any attention to this important subject, must admit that fruit and farinacea are much more appropriate than the flesh of animals, as a diet for the young. Those who restrict their children to the former diet, may reasonably hope to secure for them the blessings of health, and a proper balance between the various organs of the brain ; so that the sentiments and propensities, instead of acting from blind and uncontrollable instinct, shall receive their direction from the superior faculties.

455. Sufficient evidence has, I think, been adduced to convince an unprejudiced mind that, under a well-chosen vegetable diet—for it is so various, that all constitutions and temperaments may be suited—the mental and moral faculties may be much better trained, and admit of greater elevation, than under an animal or mixed diet, which too frequently renders early discipline and moral instruction inefficient. Under the former, along with mental, moral, and religious instruction, greater ease and freedom of thought will be experienced ; calmness and placidity of temper will be promoted ; the cares and disappointments of the world will cause less anxiety and irritation of mind ; the passions and propensities will be less likely to pass beyond their legitimate bounds ; acquisitiveness, and combativeness, and destructiveness, will not be so liable to degenerate into selfishness, quarrelsomeness, and cruelty ; and man will be the more prepared for the universal reign of peace, benevolence, justice, and truth.

* *Graham's Lectures*, vol. II., p. 340, &c

CHAPTER XV.

VEGETABLE DIET FAVORABLE TO LONGEVITY.

456. If life be a good, then must long life be a great good, provided that the sensitive, mental, and moral powers, which are the principal sources of enjoyment and happiness, still retain their integrity. Men, however, so frequently associate old age with protracted feebleness, insensibility, and helplessness, that longevity appears to some scarcely desirable. "An advanced term of life and decrepitude," says Dr. Southwood Smith, "are commonly conceived to be synonymous; the extension of life is vulgarly supposed to be the protraction of the period of infirmity and suffering; that period which is characterized by a progressive diminution of the power of sensation and a consequent and proportionate loss of the power of enjoyment, the 'sans teeth, sans eyes, sans taste, sans every thing.' But this is so far from being true, that it is not within the compass of human power to protract in any sensible degree the period of old age properly so called; that is, the stage of decrepitude. In this stage of existence, the physical changes that successively take place clog, day by day, the vital machinery, until it can no longer play. In a space of time fixed within narrow limits, the flame of life must then inevitably expire, for the processes that feed it fail. But though, when fully come, the term of old age cannot be extended, the coming of the term may be postponed. To the preceding stage, an indefinite number of years may be added. And this is a fact of the deepest interest to human nature."

457. "The division of human life into periods or epochs is not an arbitrary distinction, but it is founded on constitutional differences in the system, dependent on different physiological conditions. The periods of infancy, childhood, boyhood, adolescence, manhood, and old age, are distinguished from each other by external characters, which are but the outward signs of internal states. In physiological condition, the infant differs from the child, the child from the boy, the boy from the man, and the adult from the old man, as much in physical strength as in mental power. There is an appointed order in which these several states succeed each other; there is a fixed time at which one passes into another. That order cannot be inverted; no considerable anticipation or postponement of that fixed time can be effected. In all places, and in all circumstances, at a given

time—though not precisely at the same time in all climates and under all modes of life—infancy passes into childhood, childhood into boyhood, boyhood into adolescence, and adolescence into manhood. In the space of two years from its birth, every infant has ceased to be an infant, and has become a child; in the space of six years from this period, every male child will become a boy; add eight years to this time, and every boy will have become a young man; in eight years more, every young man will have become an adult man; and in the subsequent ten years every adult man will have attained his highest state of physical perfection. But at what period will this state of physical perfection decline? What is the maximum time during which it can retain its full vigor? Is that maximum fixed? Is there a certain number of years in which, by an inevitable law, every adult man necessarily becomes an old man? Is precisely the same number of years appointed for this transition to every human being? Can no care add to that number? Can no imprudence take from it? Does the physiological condition or the constitutional age of any two individuals ever advance to precisely the same point in precisely the same number of years? Physically and mentally, are not some persons older at fifty than others at seventy? And do not instances occur in which an old man who reaches even his hundredth year, retains as great a degree of juvenility as the majority of those who attain to eighty?"

458. "If this be so, what follows? One of the most interesting consequences that can be presented to the human mind! The duration of the periods of infancy, childhood, boyhood, and adolescence, is fixed by a determinate number of years. Nothing can stay, nothing can retard the succession of each. Alike incapable of any material protraction is the period of old age. It follows, that every year by which the term of human existence is extended is really added to the period of mature age; the period when the organs of the body have attained their full growth and put forth their full strength; when the physical organization has acquired its utmost perfection; when the senses, the feelings, the emotions, the passions, the affections are in the highest degree acute, intense, and varied; when the intellectual faculties, completely unfolded and developed, carry on their operations with the greatest vigor, soundness, and continuity; in a word, when the individual is capable of receiving and communicating the largest amount of the highest kind of enjoyment."

459. "A consideration more full of encouragement—more animating, there cannot be. The extension of human life, in whatever mode and degree it may be possible to extend it, is the protraction of that portion of it, and only of that portion of it, in which the human being is capable

of receiving and communicating the largest measure of the noblest kind of enjoyment." "Considerations purely physiological, establish this indubitably; but it is curious that a class of facts totally different from those of a physiological nature, equally prove it—namely, the result obtained from the observation of the actual numbers that die at different ages, and the knowledge consequently acquired of the progressive decrement of life." *

460. It is perfectly clear, therefore, that longevity (properly so called) is not a prolongation of the period of decrepitude and helplessness, as some imagine; but an extension of that period of life when man can fully appreciate the blessings of existence; when he is susceptible of the greatest amount of real enjoyment; and when he is best qualified for advancing the happiness of his fellow-creatures. "Longevity then is a good, in the first place, because it is a sign and a consequence of the possession of a certain amount of enjoyment; for longevity and happiness, if not invariably, are generally coincident; and grief and misery always abbreviate existence: in the second place, because, this being the case, in proportion as the meridian period of life is extended, the sum of enjoyment must of course be augmented. And this view of longevity assigns the cause, and shows the reasonableness of that desire for long life which is so universal and constant as to be commonly considered instinctive."

461. Every reasonable and enlightened person, therefore, who prefers permanent health and happiness to momentary gratification, will seriously and sedulously inquire, by what means these blessings are to be attained; and will cheerfully adopt the habits of the thinking few, rather than comply with the time-honored habits of the unthinking many. Let us then endeavor to discover what relation diet bears to longevity:—1. By ascertaining what light science casts upon the subject. 2. By observing how far theory is substantiated by experiment.

462. Liebig infers, from the deficiency or absence of the alkaline phosphates in the secretions of the Herbivora, that the metamorphosis of the tissues, in them, takes place much slower than in the Carnivora; and many other facts confirm the inference. Dr. Lehmann found, by experiments on his own person, that an exclusively animal diet augmented the solid residue in the urine, while vegetable food diminished it. (336.)

463. In the Carnivora the rapid transformation of their tissues is a condition of their existence, because it is only as the result of the change of matter in the body that those substances can be formed which are destined to enter into combination with the oxygen of the air; and in this sense we may say that the non-azotized constituents of the food of the Herbivora

* *Philosophy of Health*, vol. 1, p. 111.

impede the change of matter, or retard it ; or render unnecessary, at all events, so rapid a process as occurs in the Carnivora. (200.) Hence, also, a less amount of oxygen is necessary for respiration in the Herbivora, and less muscular exercise is required of them. "Man, when confined to animal food," says Liebig, "respires, like the Carnivora, at the expense of the matters produced by the metamorphosis of organized tissues ; and, just as the lion, tiger, and hyena, in the cages of a menagerie, are compelled to accelerate the waste of organized tissues by incessant motion, in order to furnish the matter necessary for respiration ; so the savage, for the very same object, is forced to make the most laborious exertions, and go through a vast amount of muscular exercise. He is compelled to consume force, merely in order to supply matter for respiration."* In confirmation of Liebig's observation, we may again refer to the experiments of Dr. Fyfe, (256,) who ascertained that, in the same individual, while animal food is taken, a larger quantity of air is required for respiration, and a greater proportion of oxygen is consumed, than when vegetable aliment is employed. Mr. Spalding, a diver, also found that he consumed more atmospheric oxygen in his diving-bell, when he had used a diet of animal food, or drunk spirituous liquors ; and experience, therefore, had taught him that vegetable food, and water for drink, were best adapted for the performance of the duties of his business.† Dr. Fyfe, however, differs from Mr. Spalding, in his account of the effect of *alcohol* on the respiratory function. It is very probable that the excess of oxygen which is found in the pectinaceous principle, or vegetable jelly of fruits, and in the other non-azotized principles of vegetables generally, is the means of thus diminishing the function of respiration. (200.)

464. Another fact is also worthy of observation, in connection with our subject. So far as chemical tests are concerned, the chyle of all animals is the same, whatever kind of food it may be formed from ; but with regard to its physiological qualities, and its relations to the vital economy, its character varies with the food. Dr. Marcet, Oliver, L'Heritier, and other physiologists, unite in stating that chyle elaborated from animal food putrefies in three or four days at longest ; while chyle from vegetable food, from its greater purity and more perfect vitality, may be kept for many days, without becoming putrid.

465. It is said by Mr. Graham to be "well known, also, that human blood formed from animal food will putrefy, when taken from the living

* Animal Chemistry, p. 77.

† See Dr. John Murray's "System of Materia Medica and Pharmacy," v. 1, p. 509. Fifth edition. Edin. 1828.

vessels, in a much shorter time than that formed from pure vegetable aliment; and that there is always—other things being equal—a much greater febrile and putrescent tendency in the living bodies of those who subsist mostly on animal food, than in those who subsist wholly on pure vegetable aliment. Hence, if two healthy, robust men of the same age—the one subsisting principally on flesh-meat, and the other exclusively on a diet of vegetable food and water—be suddenly shot down and killed, in warm weather, and both bodies be laid out in the ordinary manner, and left to the action of the elements and affinities of the inorganic kingdom, the body of the vegetable-eater will remain two or three times as long as the body of the flesh-eater will, without becoming intolerably offensive from the process of putrefaction.”* Majendie fully confirms this statement; and it may here be noticed, that the excretions from the lungs, skin, kidneys, and alimentary canal of the Herbivora are far less offensive than those of the Carnivora: we may consequently infer that the breath, perspiration, &c., of the vegetarian are not so unpleasant as those of persons who feed on animal food; and the inference is supported by facts.

466. From the whole of these facts, therefore, we may conclude that the more stimulating and heating the diet, the more rapidly the changes in the relative proportion and conditions of the solids and fluids take place, the more rapidly ossification, the great process of decay, is accelerated; the solids becoming dry, inelastic, and unyielding. Hence a diet of animal food is less favorable to longevity than what we have seen to be the original and natural diet of man; namely, fruits, roots, and grain, with other farinaceous substances, which form chyle, blood, and tissues less subject to chemical decomposition, and requiring less rapid changes for the production of animal heat. The quicker the motion of any complicated piece of machinery, the sooner it is worn out; and the observation is equally true when applied to the animal structure. Each process of decay and renewal brings it nearer to its final destination; and the more we accelerate these changes by stimulating food, or any other means which increase the rapidity of the circulation and respiration, the sooner will the period of old age and decrepitude overtake us.

467. “Though the vital energies and sensibilities, therefore, which we exhaust to-day are replenished to-morrow, yet, of necessity, the process has taken something from the measured fund of life, and reduced our vital capital in proportion to the frugality or the profligacy of our expenditure. However proper the nature and condition of our aliment—however completely all our laws of external relation are fulfilled—however perfectly the

* Graham's Lectures, vol. II, p. 115.

functions of our organs are performed, and however salutary their results, yet every digestive process of the stomach, every contraction of the heart, draws something from the ultimate and unreplenished resources of organic vitality; and, consequently, the more freely and prodigally we expend the vital properties of our organs, the more rapidly we wear out the constitutional powers of replenishment, and exhaust the limited stock of life. Nothing, therefore, can be more dangerously fallacious than the opinion, which is too generally cherished and too frequently promulgated, that our daily trespasses upon the laws of life are as the dropping of water upon a rock—wearing, indeed, but so slowly and imperceptibly, as scarcely to make a difference in the duration and in the comfort of our lives.”*

468. “The more slowly man grows,” says Professor Hufeland, “the later he attains to maturity, and the longer all his powers are in expanding, the longer will be the duration of his life; as the existence of a creature is lengthened in proportion to the time required for expansion. Every thing, therefore, that hastens vital consumption, shortens life; and, consequently, the more intensive the vital action, the shorter the life. If you would live long, live moderately, and avoid a stimulating, heating diet; such as a great deal of flesh, eggs, chocolate, wine, and spices.” Animal food, and all other stimulating diet, particularly in youth, do incalculable mischief; though by such slow degrees that, in general, the evil is neither perceived nor suspected. The stream of life is hurried on precipitately; the passions are prematurely developed; and—like a plant that has been forced too rapidly, by artificial heat and stimulating composts—the organism is exhausted; and it becomes diseased and old, when it would, under a more appropriate diet, have been in its perfection. (455.)

469. Celsus affirms that “the bodies which are filled in the manner of the *athletæ*, that is, with much animal food, become the most quickly old and diseased.” “Every physiologist must admit that flesh is of a more stimulating and heating nature—causes a more rapid pulse, a hotter skin—hastens all the vital functions of the body—causes a greater exhaustion of the vital powers of the organs, and wears out the human constitution considerably faster than a proper vegetable diet. Hence, great longevity is never found among those tribes and portions of the human family who subsist principally or entirely on flesh-meat. The Patagonians, with a climate, and almost every other circumstance except their diet, exceedingly favorable to longevity, rarely attain to seventy years of age; and the average duration of life is greater with them than with any other flesh-eating

* Graham's Lectures, vol. II., p. 94.

tribe or nation.”* “Haller remarked that, from an extensive collection of cases, it appeared that persons remarkable for health and longevity had lived principally on coarse food, chiefly of vegetable articles, and food which, in the usual language, would be designated as poor, meagre, and innutritious; and it is not only matter of daily observation, but confirmed by all facts, that though the eaters of animal food seem healthy and vigorous, yet are they after a certain period of life liable to many diseases of an inflammatory character, and are very usually cut off by some disease of inflammatory or hæmorrhagic nature, the approach of which a more spare mode of living might have either delayed or averted.”†

470. “It has been established by nature, on the best grounds,” says Hufeland, “that our nourishment should be used in form rather coarse; securing full mastication and insalivation, and a longer retention in the stomach. Plain, simple food only, promotes moderation and longevity; while compounded and luxurious food shortens life. The most extraordinary instances of longevity are to be found among those classes of mankind who, amidst bodily labor and the open air, lead a simple life, agreeable to nature; such as farmers, gardeners, hunters, &c. The more man follows nature, and is obedient to her laws, the longer will he live: the further he deviates from these, the shorter will be his existence. Rich and nourishing food, and an immoderate use of flesh, do not prolong life. Instances of the greatest longevity are to be found among men who, from their youth, lived principally on vegetables, and who, perhaps, never tasted flesh.” “It seems,” says Lord Bacon, in his *Treatise on Life and Death*, “to be approved by experience, that a spare and almost a Pythagorean diet—such as is prescribed by the strictest monastic life, or practised by hermits—is most favorable to long life.”

471. The primeval inhabitants of the earth, who subsisted on fruit and other vegetables, are represented as having lived during so many years, that various ingenious methods have been invented to reduce their ages to more modern standards. No just reason, however, has been adduced for doubting the literal expressions and numbers given us in Scripture; and the natural history of other animals, which have departed less from the dictates of instinct, seems, by analogy, to confirm the account. Animals generally live from five to ten times the period elapsing between birth and maturity; and if the same law holds good with respect to man, when all the physiological laws are observed, the natural duration of human life may be fixed at several hundreds of years. Without indulging in conjec-

* Graham's Lectures, vol. II., p. 269.

† Edinburgh Medical and Surgical Journal, No. 166.

tures, however, well-authenticated and modern history supplies us with a sufficient number of examples, with which to illustrate the relation existing between vegetable diet and longevity.

472. Socrates, Plato, Zeno, Epicurus, Epaminondas, Archytus, Milo, and others of the ancients noted for wisdom, adhered to the Pythagorean or vegetable diet; and are known to have arrived at old age, with the enjoyment of uninterrupted health. The ancient Chinese, who subsisted on rice and water, are said to have been remarkable for their longevity. "The Pythagoreans, who lived on a simple vegetable diet," says Hufeland, "afforded the most numerous instances of old age." "The Essenes, as we call a sect of ours," says Josephus, "live the same kind of life as do those whom the Greeks call Pythagoreans. They are long-lived also; inso-much that many of them live above a hundred years, by means of their simplicity of diet, and the regular course of their lives."

473. It is said, that in no part of the world, in proportion to its population, are there more instances of extreme longevity than among the Norwegian peasantry, who scarcely ever taste animal food. In the severe climate of Russia, also, where the inhabitants live on a coarse vegetable diet, there are a great many instances of advanced age. The late returns of the Greek Church population of the Russian empire, give, in the table of the deaths of the male sex, more than one thousand above a hundred years of age; many between one hundred and a hundred and forty; and four between one hundred and forty and one hundred and fifty. It is stated, that to whatever age the Mexican Indians live, they never become gray-haired. They are represented as peaceable cultivators of the soil; subsisting constantly on vegetable food; often attaining a hundred years of age, yet still green and vigorous. Of the South American Indians, Ulloa says: "I myself have known several who, at the age of a hundred, were still very robust and active; which unquestionably must, in some measure, be attributed to the constant sameness and simplicity of their food." Both the Peruvian Indians and the Creoles are remarkably long-lived, and retain their faculties and vigor to a very advanced age. Slaves in the West Indies have been known to live from one hundred and thirty to one hundred and fifty years.

474. Homer attributes great virtues and longevity to a milk-diet, which, though superior to a diet of flesh-meat, is decidedly inferior to the more natural food of man, in countries where it can be procured. He says:

"And where the far-famed Hippomolgian strays,
Renowned for justice and for length of days;

Thrice happy race! that, innocent of blood,
 From milk, innoxious, seek their simple food:
 Jove sees delighted; and avoids the scene
 Of guilty Troy, of arms, and dying men.*

475. Sir William Temple† informs us, that the Brachmans among the Indians, and the Brazilians, at the time that country was discovered by the Europeans, lived to very advanced ages: some of these were said to have lived two hundred, some three hundred years; the former living principally on rice, and the latter on fruits, herbs, and plants, and knowing no drink but water. "Some of the tribes of the Arabs of the desert," according to Captain Riley, "subsist entirely on the milk of their camels. Those who adhere strictly to this diet have no sickness nor disorders, and attain to a very great age, with remarkable vigor and activity." "I am fully of opinion," says he, "that a great many Arabs on this vast desert actually live to the age of two hundred years and upwards. Their lives are regular from birth to death; their food is simple, plain, and nutritious, and without variation; their climate is dry and not changeable; they are not subject to hard labor, yet have sufficient exercise for the purposes of health; they never taste wine or ardent spirits; it being forbidden by their religion." There are so many well-authenticated instances of individuals preserving their health, strength, and mental faculties to extreme old age, by a strict abstinence from animal food and fermented liquors, that it would be tedious to recount them. I shall, however, introduce a few, by way of further illustration.

476. Henry Jenkins lived one hundred and sixty-nine years; and although it is not stated that he never ate animal food, yet if we may judge from the language of his historian, it can have formed but a very small portion of his diet: he informs us that it was coarse and sour; that is, plain and cooling. Old Parr, who died at the age of one hundred and fifty-two years and nine months, lived on old cheese, milk, coarse bread, small beer, and whey: these, with pure air and exercise, were the true "pills" that imparted to him health and stamina for so long a period of time.

477. Ephraim Pratt, of Shutesbury, who died in 1804, at the age of one hundred and sixteen years, took no animal food for forty years: he lived very much on milk, and that in small quantity; and yet he could mow "a good swath" almost to the hour of his death. His son attained to the age of one hundred and three, by similar means.

* Pope's Translation of the *Iliad*, book xiii, l. 9.

† Works, vol. ii., p. 397.

478. On the 20th of April, 1805, John Maxwell was still living at Kingston, near Forfar, nearly one hundred and four years of age. When seventy years of age, he married a third wife, who lived sixteen years with him, and bore him seven children. At the age of ninety-five, he married his fourth wife, aged thirty-two. He was an athletic man, and very fond of walking. He has travelled on foot sixty miles in nine hours; and, until he was seventy, was never beaten at walking. At the above date, he could walk from his own house to Forfar, a distance of about a mile and a half. He lived always very temperately, and on a plain diet, chiefly farinaceous, and tasted no spirits. His food for some years was pottage and milk; tea and bread in the evening, and a little wine and water, which he said he found useful to his breathing.

479. François Cailton, when upwards of a hundred years of age, often walked a league a day, and sometimes more. He still retained his hair and teeth; his sight and memory were good, and he slept tranquilly. His nourishment was almost always rye-bread and water.* "In the year 1757 J. Effingham died in Cornwall, in the one hundred and forty-fourth year of his age. He was born of poor parents, in the reign of James the First; and had been brought up to labor from his infancy. He had served long as a common soldier and a corporal; he had been present at the battle of Hockstadt. He at length returned to the place of his nativity, and worked as a day-laborer till his death. It is to be remarked that in his youth he never drank strong heating liquors; that he always lived remarkably temperately, and seldom ate flesh. Till his hundredth year, he scarcely knew what sickness was; and eight days before his end, he had walked three miles."†

480. When Johannes de Temporibus, who is said to have lived three hundred years, was asked how he prolonged his life, he replied, "By oil without, and honey within." It is told of John Bailes, who lived to the age of one hundred and twenty-eight, that his food, for the most part, consisted of brown bread and cheese, and his drink water and milk. Paul the hermit, who reached the great age of one hundred and fifteen years, of which he spent nearly one hundred in the desert, lived for the first forty years on dates and water only, and the rest of the time on bread and water. St. Anthony, who reached the age of one hundred and five years, lived for eighty years in the wilderness on bread and water, with the addition of a little salad. St. Hilarian consumed daily only fifteen figs, or six ounces of barley-bread and fresh roots; and retained his health, with cor

* M. Mazure, Secretary to the Society of Arts at Niort, France.
Hodgkin on Health,

poreal and mental vigor, to a very advanced age. Dr. Hecquet, of Paris, who lived to a very advanced age, touched neither flesh nor wine for thirty years.

481. J. J. Rousseau strenuously advocates the cause of a vegetable diet; and gives the following account, as extracted from an English paper: "An individual, called Patrick O'Neil, born in 1647, was married in 1760, for the seventh time. He served in the dragoons in the seventeenth year of the reign of Charles the Second, and in different regiments till 1740, when he received his discharge. He served in all the campaigns of King William and the Duke of Marlborough. This man had never drunk any thing except ordinary beer; he always lived on vegetables, and never ate flesh, but at the feasts he gave his family. His custom has always been, to rise and retire with the sun; at least when duty has not prevented him. He is at present in his one hundred and thirteenth year, hearing well, carrying himself erect, and walking without a stick. Notwithstanding his great age, he is not a moment idle; and every Sunday attends his parish church, with his children, grandchildren, and great-grandchildren." *

482. On the 25th of December, 1772, died at Brussels, aged one hundred and one, Elizabeth de Val, who never ate a bit of flesh, or tasted any kind of broth or soup, during the whole course of her life.† A few years ago, died at Coombe, (in Northumberland,) Joseph Ekins, aged one hundred and three; who never knew a week's illness, and subsisted entirely on bread, milk, and vegetables, for the last thirty years.‡ A shepherd died, not long ago, at Gompus, in Hungary, in the one hundred and twenty-sixth year of his age. His manner of living was very simple: he never ate animal food, but subsisted entirely on milk, butter, and cheese, and had never been ill in his life. §

483. A writer in the "Gentleman's Magazine," for August, 1787, under the signature of "Etonensis," gives us an account of one John Williamson, alias Pythagoras of Moffat, whom he describes as one of the most original geniuses that ever existed. "He was well skilled in Natural Philosophy, and might be said to have been a *moral* philosopher, not in theory only, but in strict and uniform *practice*. He was remarkably humane and charitable; and, though poor, was a bold and avowed enemy to every species of oppression. He accounted the murder, as he called it, of the meanest animal, except in self-defence, a very criminal breach of the law of nature, insisting that the Creator of all things had constituted man, not the *tyrant*, but the lawful and limited *sovereign* of the inferior animals, which, he con-

* "Emile," vol. i., p. 70.

† From a Newspaper.

* Scot's Magazine, vol. xxxix. p. 696.

‡ Morning Post, Jan. 27, 1800.

tended, answered the ends of their creation better than their despotic little lord. During the last forty or fifty years of his life, he totally abstained from animal food, and was much offended when any was offered to him. He insisted that, at best, it served but to cloud the understanding, to blunt the feelings, and to inflame every bad passion; and that those nations who eat little or no flesh—as the poor among the Scotch and Irish—were not inferior in size, strength, or courage to other men. His vegetable and milk diet afforded him, in particular, very sufficient nourishment, for when I last saw him he was still a tall, robust, and rather corpulent man, though upwards of fourscore. He died in 1768, or 1769, upwards of ninety years of age.”

484. It will doubtless be objected, that there are many examples of people living to extreme age, in full possession of their faculties, who have not restricted themselves to vegetable diet, and who have even indulged freely in animal food. This is undoubtedly true; but we know not how much longer they might have continued to enjoy the pleasures of life, had their diet been regulated by correct principles, or had they followed the dictates of pure instinct. Examples are not wanting of men of extremely intemperate habits living to a great age; yet who, except the wilfully blind, would contend from this that intoxication is favorable to long life? The constitutions of some men are naturally so strong, that they suffer much less from irregularities and indiscretions of any kind than might be expected; but this cannot justify men of weaker stamina in adopting their habits; nor do we judge correctly if we suppose that the former escape injury, merely because we are unable to detect it. It is safer, therefore, to draw our inferences from a careful investigation of physiological laws, rather than to depend upon a numerical statement of instances of extreme old age; for the life of every man is modified by a multiplicity of circumstances, the separate and combined influence of which it is impossible for us to calculate. There is not the least reason to doubt, from points already ascertained, that the more intimate our knowledge of the human frame and its relations, the stronger will be the conviction that fruits and farinacea are the natural food of man. Every new discovery in physiology and organic chemistry tends to confirm the opinion, that these are also his best food; and all experience shows that the happiest results, both to body and mind, may be confidently expected by the adoption of an exclusively fruit and farinaceous diet.

485. We have seen that upon this diet health and strength are maintained; recovery from disease is more certain; protection from epidemics more effectual; the physical powers more active; the senses of sight,

smell, and taste more acute ; the skin more perspirable ; the body more symmetrical in its development ; sensual enjoyment more exquisite ; the intellectual faculties clearer ; mental exertion less irksome ; the passions and propensities more subdued ; the dispositions more benevolent ; the morals (so far as food is concerned) more pure, and life more extended. An animal or mixed diet, on the contrary, exposes man to many very painful and dangerous diseases ; entails upon him much misery ; and, no doubt, considerably abbreviates his existence. Can any one, then, who is capable of serious reflection and candid inquiry ; who has sufficient self-command to exercise a few weeks' self-denial ; sufficient moral courage to withstand the jeers of those who suffer themselves to be carried along the stream of popular opinion ; who has an enlightened regard for his own happiness, and a proper feeling for the sufferings of dumb animals—can any one, (I say,) exercising these qualities, hesitate which diet he shall choose ? From the one he has much to hope and expect ; from the other he has much to fear.

486. "And yet the wholesome herb neglected dies,
Though with the pure exhilarating soul
Of nutriment and health, and vital powers,
Beyond the search of art, 'tis copious blest.
For, with hot ravin fired, ensanguined Man
Is now become the lion of the plain,
And worse. The wolf, who from the nightly fold
Pierce drags the bleating prey, ne'er drunk her milk,
Nor wore her warming fleece: nor has the steer,
At whose strong chest the deadly tiger hangs,
E'er ploughed for him. They, too, are tempered high,
With hunger stung, and wild necessity ;
Nor lodges pity in their shaggy breast.
But Man, whom Nature formed of milder clay,
With every kind emotion in his heart,
And taught alone to weep ; while from her lap
She pours ten thousand delicacies—herbs,
And fruits as numerous as the drops of rain
Or beams that gave them birth ; shall he—fair form
Who wears sweet smiles, and looks erect on Heaven—
E'er stoop to mingle with the prowling herd,
And dip his tongue in gore ? The beast of prey,
Blood-stained, deserves to bleed ; but you, ye flocks,
What have you done ? ye peaceful people, what,
To merit death ? you who have given us milk
In luscious streams, and lent us your own coat,
Against the winter's cold ? And the plain ox,
That harmless, honest, guiltless animal,
In what has he offended ? He, whose toil—
Patient, and ever ready—clothes the land
With all the pomp of harvest ; shall he bleed,

And struggling groan beneath the cruel hands
E'en of the clown he feeds? And that, perhaps,
To swell the riot of the autumnal feast,
Won by his labor? Thus the feeling heart
Would tenderly suggest; but 'tis enough,
In this late age, adventurous to have touched
Light on the numbers of the Samian saga." *

CHAPTER XVI.

DIET CONSIDERED IN ITS RELATION TO POPULATION AND THE MORAL PROGRESS OF MAN.

487. To attempt the prediction of events which, in all probability, can only occur some hundreds or thousands of years hence, will perhaps be considered a mark of great presumption. In doing so, however, I lay no claim either to special inspiration, or to superiority of intellect; but draw my inferences respecting the future from well-ascertained facts of the present time, and foretell circumstances that may hereafter be from those which already exist. The inorganic laws of nature have, during some centuries, been attentively studied, by men of first-rate abilities; and the knowledge thus obtained has been successfully applied in explaining, controlling, and foretelling various phenomena of consequence to the welfare and happiness of mankind.

488. Pythagoras, Kepler, Newton, La Place, and many others, have devoted their splendid talents to the consideration of the laws that regulate the motions of planetary and cometary bodies; and the consequence is, that the precise situation of a number of those orbs in the regions of space can be ascertained for ages yet to come. But our knowledge of the laws that govern organic life, more especially of those upon which intellectual, moral, and social perfection depends, is extremely limited; and even much of that which is both known and acknowledged is rendered nugatory and inert, in consequence of the superior force of custom, prejudice, moral cowardice, and gross selfishness. It is in the order of nature, that the inorganic laws should be first studied; because, without a correct knowledge of these, to a certain extent, we should be ill prepared for investigating the

* Thomson's Spring, L. 325

still more intricate phenomena of life : but having made so rapid a progress in the arts and sciences connected with inanimate nature, it is a matter of wonder and regret that the laws of vitality, and the mental, moral, and social sciences, are as yet little attended to, and very imperfectly understood. It is time that civilized man should rouse himself from his lethargy, and apply himself with energy to the extirpation of disease, poverty, crime, and misery, by ascertaining, and then endeavoring, as far as may be, to remove their causes ; and to the promotion of health and happiness to every member of the human family—in a word, to the production of the greatest good to the greatest number of his race.

489. The organic laws, though more complicated, are no less certain than the inorganic ; nor are they farther removed from the control of human agency, when correctly understood ; and I trust we are upon the eve of a glorious period, when the physical, mental, moral, and social laws of human life shall be more clearly ascertained, and effectually directed to the production of all the blessings above mentioned. It is from a very limited consideration of one or two of these laws, that I venture to speak of the future food of mankind—not, of course, with that confidence and certainty which attach to the consideration of the natural and best food of man ; for though we may be well acquainted with the laws of nature exercising their influence at present, we cannot calculate upon those which, in the course of time, may successively come into operation, varying and controlling the results which we may at present anticipate. There are, however, several cogent reasons for believing that fruit, roots, grain, and other vegetables, will be the general, if not the universal food of mankind ; notwithstanding the apparent improbability of such an event, judging from the present habits of society, particularly in this island. The evidence upon which this result is expected may be considered under four distinct heads :—1. Physical. 2. Mental. 3. Moral. 4. Social.

490. The physical evidence appears from the difficulty of procuring supplies for a rapidly increasing population, on a diet of flesh, or of a mixed character. While the population of a country is small, the flesh of animals is obtained with much greater ease than fruit and grain, which, in temperate climates, require knowledge and industry for their production. So redundant is animal life in some countries, that the inhabitants destroy immense numbers for the sake of their fur, skins, or feathers, leaving their carcasses to putrefy as useless. As population and civilization advance, the flesh of animals gradually becomes more valuable. Great attention to breeding, feeding, and protecting animals then is necessary for the purpose of supplying their flesh in sufficient quantity to meet the demands of

luxury ; large tracts of valuable land must be appropriated to their support ; till, at last, instead of being the cheapest of all food, from its abundance compared with population, it becomes the most expensive. As a nation advances in wealth, also, it generally advances in extravagance ; and the appetite is indulged without any restraint, except such as the necessary consequences of excess impose on it. Hence, as the use of animal food becomes more general among the rich, its consumption is also increased among the classes beneath them ; it is finally deemed a necessary of life ; and no meal is considered complete, unless a portion of some animal has formed a part of it.

491. The opinion is pretty generally entertained that the amount of nutriment in animal food is much greater than is contained in any vegetable production : but this is undoubtedly a mistake. Flesh, from its stimulating qualities, imparts a feeling of strength, and is, on that account, thought to be more nutritious than any other kind of food. (254.) "It, however, not only exhausts the stomach more in the process of gastric digestion, but works the whole organic machinery of life with more rapidity and intensity, and therefore causes a proportionably greater waste of the substance of the organs in a given time, and, consequently, increases the demand of the system for fresh supplies of aliment."

592. Chemical analysis has shown that while beef, mutton, and other kinds of flesh contain only 25 per cent. of nutritious matter, wheat contains 85, barley 84, rice 92, oats 82, peas 84, and potatoes (those weak and watery vegetables, as they are generally considered) contain from 20 to 28 per cent. of soluble nutriment.* It will probably be objected by some, that the character of the nutriment in these articles is very different. This is undoubtedly true ; for while that contained in flesh consists principally of albumen, a highly azotized substance, that of the potato is almost entirely starch, with a very small amount of protein. (192 and 197.) Hence, though potatoes (without being combined with milk, or some other azotized substance) are inadequate to the full development of human muscle, except they are eaten in very large quantities ; yet flesh alone is equally unfit for the purpose, except in amount equal to that required on a potato-diet. But it is probable (200) that, by means of the nitrogen of the atmosphere, starch is converted, during the digestive process, into protein ; consequently, though potatoes, rice, and other farinaceous substances be deficient of this important element, they are, nevertheless, highly nutritious articles of diet.

493. The Poor-Law Commissioners found that many of the Irish pea-

* See Appendix, C.

santry consume nine pounds of potatoes in their two daily meals. Four pounds of potatoes may be estimated as nearly equivalent to one pound of flour, or to rather more than one and a quarter pound of bread ; therefore, nine pounds of potatoes are equal to three pounds of bread ; but as two pounds of bread daily are found to be sufficient for the support of a man taking moderate exercise, it would appear that nine pounds of potatoes to each individual daily is too high an estimate. The amount of potatoes necessary for the support of a family consisting of a man, his wife, and four children, is calculated (by Sir John Sinclair) to be about fourteen thousand pounds for a year, or nearly seven pounds to each individual daily.

494. In the year 1840, some experiments were made on the effects of different diets on the prisoners confined in the Glasgow Bridewell, and the following extract from the Report of the Inspectors of Prisons deserves notice, as illustrating the preceding remarks on the nutritive powers of potatoes :

"Eighth Diet.—Cost, including cooking, 1½d.

Breakfast.—2 lbs. of potatoes, (boiled.)

Dinner.—3 lbs. of potatoes, (boiled.)

Supper.—1 lb. of potatoes, (boiled.)

495. "A class of ten young men and boys was put on this diet. All had been in confinement for short periods only, and all were employed at light work—teazing hair. At the beginning of the experiment, eight were in good health, and two in indifferent health ; at the end, the eight continued in good health, and the two who had been in indifferent health had improved. There was, on an average, a gain in weight of nearly three pounds and a half per prisoner ; the greatest gain being eight pounds and a quarter by a young man whose health had been indifferent at the beginning of the experiment. Only two prisoners lost at all in weight, and the quantity in each case was trifling." The prisoners all expressed themselves quite satisfied with this diet, and regretted the change back again to the ordinary diet." Another experiment was as follows :

"First Diet.—Cost, including cooking, 2½d.

Breakfast.—8 oz. of oatmeal, made into porridge, with a pint of buttermilk.

Dinner.—3 lbs. of boiled potatoes, with salt.

Supper.—5 oz. of oatmeal, made into porridge, with half a pint of buttermilk.

496. "Ten prisoners were put on this diet, five men and five boys, all under sentences of confinement for two months, and all employed at light work—picking hair and cotton. At the beginning of the experiment, eight were in good health, and two in indifferent health ; and they had, on

an average, gained more than four pounds each in weight; only one prisoner, a man, having lost weight. The greatest gain was nine pounds, four ounces, and was made by one of the men; the prisoner who was reduced in weight had lost five pounds, two ounces."

497. That a considerable degree of physical power may be maintained on potatoes only, we learn from John M. Andrew, of Remsen, N. Y., who, after having adopted a vegetable diet for sixteen months, thus writes: "I do not go beyond the truth, when I say that I cannot find a man to vie with me in the field with the scythe, the fork, or the axe. I do not want any thing but potatoes and salt, and I can cut and put up four cords of wood in a day, with no very great exertion. I have frequently been told by friends that my potato-and-salt system would not stand the test of the field; but I have silenced their clamor, by actual demonstration with all the implements above named. At present, no consideration would induce me to return to my former mode of living."

498. Barley is considered an extremely nutritious article of diet. A member of the medical profession, at Munich, had to supply with provisions a number of persons under his care; and he found, from considerable experience, that soup made with pearl-barley, split-peas, and potatoes, boiled about three hours, and poured upon some bread cut small, yielded one of the most satisfying, wholesome, and nutritious diets he could produce. He ascertained that nineteen ounces of this soup afforded sufficient nourishment for a full-grown person. There was no animal food or fat in it; he only added a little salt and a little ginger. He found that *no other substance* was a substitute for the barley. He tried flour, rice, and other things; but the soup was never found to be so nutritious and strengthening.* Count Rumford† also regarded barley-meal, when used for soup, as three or four times as nutritious as wheaten flour.

499. It was shown (175, &c.) that human aliment should contain both an azotized and a non-azotized principle; the former for the purpose of nutrition, and the latter principally for the support of respiration and the production of animal heat. If, therefore, flesh, which contains only the former principle, be exclusively employed as human food, an immense amount of muscular exercise is requisite, and the body must undergo the process of waste and renewal much more rapidly than under a vegetable or mixed diet, in order to supply the carbon and hydrogen for the support of respiration; and this rapid metamorphosis of tissue renders necessary an increased supply of food. (195, 463.) "Man, when confined to animal diet, requires for his support and nourishment extensive sources of food—

* London Encyclopedia, article "Food."

† Essay on Feeding the Poor.

even more widely extended than the lion and tiger ; because, when he has the opportunity, he kills without eating. A nation of hunters, on a limited space, is utterly incapable of increasing its numbers beyond a certain point, which is soon attained. The carbon necessary for respiration must be obtained from the animals, of which only a small number can live on the space supposed. These animals collect from plants the constituents of their organs and of their blood, and yield them, in turn, to the savages who live by the chase alone. They, again, receive this food unaccompanied by those compounds, destitute of nitrogen, which, during the life of the animals, served to support the respiratory process. In such men, confined to an animal diet, it is the carbon of the flesh and of the blood which must take the place of starch and sugar.”*

500. It has been ascertained, by chemical analysis, that fifteen pounds of flesh contain no more than four pounds of starch. Liebig, therefore, concludes that if a man whose usual diet consists of animal food and starch, in equal quantities, should discontinue the starch, and subsist on flesh alone, he would require five times as much of the latter as he previously consumed ; so that one pound of starch appears to supply the place of four pounds of flesh. Whoever, therefore, would lessen the amount of farinacea in his diet, and substitute animal food in its place, must add four pounds of the latter for every pound by which the former is diminished. Wheaten flour, from which neither bran nor sharps have been removed, seems to contain precisely that proportion of azotized and non-azotized matter which is best adapted to man in temperate climates, (204, &c. ;) and actual experiment has fully proved that two pounds of good wheaten bread will sustain a man accustomed to such diet longer and better than eight pounds of the best flesh-meat. Well-authenticated facts, also, further confirm the deductions of science.

501. “The Russian and Greek laborers, and those of many other countries, will work from twelve to sixteen hours a day, with great power, activity, and cheerfulness, and subsist on about one pound of coarse bread, with a small bunch of garlicks, figs, raisins, apples, or some other fruit, containing little nourishment ; while, according to Ross Cox—who spent several years beyond the Rocky Mountains, as an agent of the American North-western Fur Company—the Canadian boatmen, and others in the Company’s service, receive, according to stipulation, and regularly consume, when they have no other food, eight pounds of flesh per day for each man, and ten pounds, if it contain any bone ; and these men, if their rations

* Liebig’s Animal Chemistry, p. 76.

of food are cut short for two or three days, are exhausted and unstrung.”* Captain Ross—who had had so many years, experience in the Arctic regions—remarks, that the half-savage Canadian, with six pounds of solid meat in the day, or eight pounds of fish, which form his regulated allowance, is not worth more, in point of exertion, than the Englishman, after a little practice in that labor, who is amply fed with one pound of the former, and a proportional quantity of the latter.† The Captain appears to have overlooked the decided advantage which the Englishman derives from a mixture of farinaceous food with his fish or flesh. He observes of the Esquimaux: “Their breakfast, consisting of five or six pounds of seal each, seemed a highly satisfactory one to them. We had judged as incautiously in measuring their appetites as their tastes by our own; but a special larder was admitted to be necessary, if we were to give dinner-parties.”‡ He also informs us, that while one salmon and a half, in a cooked state, were sufficient for five of his company, each Esquimaux devoured two, in a raw state. “Each man had eaten fourteen pounds of this raw salmon: and it was probably but a lunch, after all, or a superfluous meal, for the sake of our society.”§ He further remarks, “that the Arab, on one small allowance of barley-meal in the day, is more enduring of fatigue than an Esquimaux, who perhaps eats twenty pounds of flesh and oil; while he is also stronger and more active.”||

502. “The Patagonians,” says the Rev. M. Armes, who spent three months among them as a missionary, “subsist almost entirely on the guanaco, which they take in the chase. They will often, in their indolence, suffer their provisions to run very low, and for two or three days subsist on very little; and then, when urged by hunger, they will mount their horses and go out in pursuit of fresh supplies. And when they return with their game, it is a very common thing for a single Patagonian to consume from fifteen to twenty pounds of flesh in the course of a day. Indeed, I have frequently seen a single man, after two or three days’ severe abstemiousness, consume at one meal, in the course of three hours, the half of a guanaco, which would weigh from fifteen to twenty pounds. This flesh was generally eaten very slightly cooked.” The accounts which have been given of the voraciousness of the Esquimaux, and other flesh-eating tribes of the northern regions of Europe, Asia, and America, and the enormous quantities which they consume in a day, and at a single meal, are almost incredible; yet they have been repeatedly corroborated by good authority

* Graham's Lectures, vol. II., p. 118.

† Ross's Narrative of a Second Voyage, &c., p. 285.

‡ Ibid., p. 187.

§ Ibid., p. 284.

|| Ibid., p. 485.

On the other hand, millions of the inhabitants of India and China subsist on a few ounces of rice a day for each individual; and where they are in other respects temperate and correct in their habits, they are well nourished, athletic, and active. The American Indian will travel far and subsist long on a small bag of maize, parched and pounded; taking only six or eight ounces of it per day, mixed with water.

503. It will perhaps be objected, that the Carnivora generally consume less food than the Herbivora. But it should be recollected that, as the skin of the former is destitute of perspiratory pores, they lose, for equal bulks, much less heat than the latter, which are compelled to restore the lost heat by means of food adapted for respiration; and as the skin of man abounds with perspiratory pores, he is necessitated, when feeding on flesh solely, to eat in greater abundance. Science and fact, therefore, unite in proving, that if any portion of land yield only the same weight of grain that it does of animal food, the former will support four times as large a population as the latter. It is well known, however, that if two equal portions of land be employed, the one in grazing, the other in producing fruit, grain, potatoes, &c., the weight of the latter will considerably exceed that of the flesh obtained by feeding cattle. In Lance's "Cottage Farmer," it is shown that the quantity of land required to keep an ox will produce an abundant supply of vegetable food for at least four persons.

504. The estimated produce of an acre of land is, of

Mutton*	. . .	228 lbs. per year; or 10 oz. per day.	
Beef*	. . .	132½	" 8 "
Wheat†	. . .	1,680	" 4½ lbs. "
Barley	. . .	1,800	" 5 "
Oats	. . .	2,300	" 6 "
Peas	. . .	1,650	" 4½ "
Beans	. . .	1,800	" 5 "
Indian Corn	. . .	3,120	" 8½ "
Rice‡	. . .	4,565	" 12½ "
Potatoes§	. . .	20,160	" 55 "
Parsnips	. . .	26,880	" 74 "
Carrots	. . .	33,600	" 92 "
Yams	. . .	40,000	" 110 "
Turnips	. . .	56,000	" 154 "
Beets	. . .	75,000	" 205 "

* As stated by Middleton.

† Good land will produce five quarters, or 2,520 lbs. per acre, and, under spade husbandry, as many as fourteen quarters per acre have been obtained. By improved and careful culture other crops may be increased in similar proportions.

‡ Breton's China, vol. ix., p. 29.

§ It is said that Mr. Rawson and others have obtained 84,122 lbs. per acre, or 98 lbs. per-day.

The produce of many fruit trees considerably exceeds that of the potato; this has been proved by many observers. Rousseau and M. D. St. Pierre ascertained it of the chestnut tree; Forster and others of the bread-fruit tree; Humboldt of the banana. The latter gentleman calculated, that 1,000 square feet of banana plants will produce 4,000 lbs. of its nutritive fruit; while the same space would give only 38 lbs. of wheat, and 462 lbs. of potatoes. It might easily be proved also, that keeping cows for their milk yields a greater profit than fattening cattle for the butcher: and milk, used for human food, or formed into butter and cheese, is much more economical than converting it into veal.

505. From these facts we draw two important inferences: 1. A fruit and farinaceous diet admits of greater economy than either an animal diet or a mixed one. 2. Any definite portion of land will support a larger population on this diet than upon any other. The first inference applies to man in his private and domestic relations, and appeals to his self-interest; the latter is connected with his social and national relations, and appeals to his sympathy and benevolence. A person disposed to indulge in the choicest fruits, and other scarce productions, may render a vegetable diet as expensive as he pleases: but, upon this diet also, health, strength, and enjoyment may be procured at a very trifling cost, and this is admitted even by the most strenuous advocates of an azotized diet. At the late agricultural meeting at Drayton Manor, Dr. Lyon Playfair said: "At London prices, a man can lay a pound of flesh on his body with milk at three shillings and ninepence; with potatoes, carrots, and butcher's meat, free from bone and fat, at two shillings; with oatmeal at one shilling and tenpence; with bread, flour, and barley-meal at one shilling and twopence; and with beans and peas at less than sixpence. These considerations are far from trivial, because, when we consider that an equal amount of nutritious matter can be obtained from one food at less than one-fourth the cost of another, this is only saying that in times of distress, with an intelligent application of money, we can feed four people where formerly we only could feed one." This statement is made on the supposition that all articles of diet are nutritious in proportion to the amount of protein they contain; but many facts are opposed to this opinion: and if we estimate each production by the solid nutriment it comprises, the comparison will be much more in favor of bread, oatmeal, rice, potatoes, &c., than is here represented. (See Table B and remarks.) When a man is thoroughly convinced how readily, and at how small an expense, the real wants of nature can be satisfied without any abridgment of his pleasures, (419, &c.) he feels a degree of independence which no worldly wealth can supply, and

which confers on its possessor important advantages. It encourages him to exercise a stronger faith in the divine promise—"Bread shall be given him; his waters shall be sure." "Trust in the Lord and do good, so shalt thou dwell in the land, and verily thou shalt be fed." He feels that he can afford to defend what he believes to be truth, though surrounded by error and strenuous opposition. He is less likely to be influenced by the slavish fear of man, and boldly speaks his convictions, alike unmoved by the smile of pity or the laugh of ridicule. In fine, he learns self-reliance, and becomes rich by becoming poor in his desires; and is satisfied with pleasures which a very small amount of labor can purchase. He refuses no delicacy which a bounteous Providence presents to him, but experiences no want so long as he has a crust of bread and water from the brook.

506. The second inference, however, involves far weightier consequences than the first. If we admit—what there seems little reason for doubting—that an average of six pounds of animal food a day would be necessary for each individual, on an *exclusively flesh-diet*, then, since an acre of land employed in feeding cattle only produces eight or ten ounces of flesh per day, it would require ten or twelve acres to support each person for a year; whereas one acre of wheat would supply three persons, and (according to Curwen) one acre of potatoes would serve at least nine persons with sufficient food for the same space of time; so that a diet of potatoes and fruit would support one hundred times the number of inhabitants that could be maintained on an *exclusively flesh-diet*. Not to reduce man, however, to the necessity of living on the cheapest or most productive kind of food—which is by no means desirable for any nation, not even for the lowest classes of society—let us suppose man enjoying the greatest variety of the choicest and most delicious fruits, roots, and grains; the discoveries of science leading to improved culture, and triumphing over deficiency of temperature and unsuitableness of climate; and let us further suppose that, by thus administering to the gratifications of taste and the pleasures of the table, four-fifths of the whole produce is sacrificed; still the land would be competent to maintain twenty times the population it could support on an exclusive diet of animal food.

507. According to the last census, there are in the United Kingdom of Great Britain and Ireland, twenty-seven millions of inhabitants, and about sixty-three millions of acres of land, capable of being cultivated; consequently there are two and one-third acres for each man, woman, and child. It appears from the Table,* that the land would support a population of only five millions two hundred and fifty thousand on a full and exclusive

[* See Appendix D.]

animal diet; one hundred and eighty-nine millions on wheat; and five hundred and sixty-seven millions on potatoes; without taking into account the additional produce obtainable by improved culture. Suppose one-third of the land capable of cultivation were appropriated to the production of fruits, flowers, and timber, and to the support of cows, sheep, and other animals, for the supply of milk, wool, &c.; one-third to the cultivation of wheat, oats, peas, &c.; and the remaining third to potatoes and other roots or tubers yielding human food; then, according to the present average produce of land,

	Inhabitants.
\$1,000,000 of acres of wheat, &c., at 8 qrs. per acre, will feed - - -	68,000,000
\$1,000,000 of acres of potatoes, &c., one acre supporting nine persons, - - -	189,000,000
	<u>257,000,000</u>

This number is more than nine times the present population, exclusive of the twenty-one millions of acres reserved for supplying milk, butter, cheese, and fruit. It has been proved by repeated trials, that much larger crops of grain, peas, potatoes, &c., can be obtained by spade husbandry than by the present methods; and though the former is much more expensive, yet it would benefit the country by an increased supply of food, and by the employment of more laborers, and repay the farmer for his extra outlay. Man has increased and multiplied, but he has not yet replenished the earth and subdued it. He has not adopted wise measures for collecting and returning to the earth the most valuable liquid and solid manures; nor has the land yet been cultivated with that regard to economy which our increasing population demands; nor can this be the case till laborers are more freely employed upon it, and probably not so long as extensive tracts of land are in the charge of one individual. The land in England should be cultivated much more like a garden than is the case at present, by which means our redundant population would be fully and profitably employed, and we should then need neither emigration nor foreign supplies.

508. In this country the cultivation of fruits has not yet received the attention it deserves, whether we regard the varieties which might be obtained, the perfection to which they might be brought, or the quantity of land which should be employed in producing them. Many clay soils, which are not remunerative under a corn-crop, would be useful to the country and profitable to the occupants if planted with the various hardy kinds of fruit trees. Many useless trees now stand in hedge-rows which might be replaced by varieties of the apple and pear; and it has frequently occurred to me that many advantages would result from planting the sides of railroads with piums, cherries, apples, pears, &c.

1. As any given portion of land is capable of producing more human food in the form of fruit than under any other mode of culture, there would be as much nutriment restored to the country as was lost by the withdrawal of the land from cultivation by the construction of the railway,

2. As lines of railway pass through every variety of soil and subsoil, portions of land might be found suitable for every kind of hardy fruit tree, which is scarcely ever the case with any tract of land occupied by one individual.

3. As the lines pass through various sheltered as well as exposed situations, a general failure of fruit-crops on these lines would seldom occur.

4. The common kinds of fruit would become so much more abundant as to render them much cheaper than at present; and as sugar may be expected to be reasonable in price, they would afford many wholesome preparations for the laboring classes; the consumption of sugar would also be increased.

5. These lines of trees would be both ornamental and agreeable, whether in blossom or in fruit; and the trees might be of such a size and at such distances as to be in no respects detrimental or inconvenient.

6. The fruit being on the great lines of traffic, would be easily collected in good condition, and forwarded with ease to the markets for consumption.

7. The trees would require little attention, and would be less exposed to depredations than in many other situations.

8. The planting could be effected at comparatively small expense to the companies, and the crops might be farmed by men employed on the lines.

9. Intermediate situations might be occupied by gooseberries, currants, raspberries, strawberries, and other fruits which would be in great demand at the various stations.

509. In the vegetable kingdom, man has resources almost without end; and when science shall have shed its meridian light upon the production and preparation of food, every tree, shrub, and herb, will assist in supplying nutriment for the human race. When man shall be able to ascertain the properties which any article of nutriment must possess to be in direct relation with his alimentary organs, his blood, and tissues, he will, in all probability, discover an easy and efficient mode of combining the various properties of vegetables, so as to produce in infinite abundance the food best adapted to the perfect development of his organic structure. If fruit, or bread, as formed by the ordinary means, should be scarce, there is little doubt but the skill and ingenuity of man will aid him in artificially combining the juices and fibre of plants, so as abundantly to supply that of which the vicissitudes of climate, or other unforeseen contingencies, may

have deprived him. The very flowers which regale us with their sweet perfumes may, perhaps, hereafter be made to contribute also to the gratification of the palate. Many of the fruits of tropical climates are said to be the most delicious imaginable, but will not bear transporting to great distances, and, if they would, they do not contain sufficient carbon and solid matter to support the human frame in cold climates. But is it not possible so to combine the fragrance of flowers with the farina of grain and roots, as to produce an artificial fruit, uniting the aroma and piquant flavor of tropical productions with the nutritious properties of those of colder climes? The flowers of the temperate zones are generally more finely scented than those of the tropics; is it merely for the purpose of gratifying the sense of smell, or of reminding man also of some ulterior purpose to which they may be applied? In the admirable adaptation of external nature to the organization of man, we seldom find provision made for sensual gratification as an ultimate; the pleasure we experience is usually the means adopted for securing our attention to what is designed for the well-being and permanency of the organism. It is, therefore, reasonable to conclude that the fragrance of flowers either administers directly to our health through the sense of smell, or is intended to lead us to the employment of it in our food. Perhaps the Japanese resort to some such means to flavor their rice. See § 269.

510. Wood can be converted into starch, and starch into sugar or vinegar. "When lignin is comminuted and reduced by artificial processes," observes Dr. Prout, "it is said to form a substance analogous to the amylaceous principle, and to be highly nutritious." Professor Autenrieth (of Tubingen) states, that when wood is deprived of every thing soluble, reduced to powder, repeatedly subjected to the heat of an oven, and then ground in the manner of corn, and boiled with water, it yields a flour, which forms a jelly, like that of wheat-starch, and, when fermented with leaven, makes a perfectly uniform and spongy bread. The "*Moniteur*," in May, 1830, mentioning that wheat-straw, chopped and ground, yields a flour of a coarse description, but agreeable and nutritious, added, that its bread was *superior* to the *common* bread used by the lower orders on the Continent. Chance led a miller, in the Côte d'Or, to discover the means of converting straw into a farina of pretty good quality. A short time ago the Duc d'Angoulême, passing through Dyon, tasted some small loaves made of it, and took some to show the King. It was M. Maitre, founder of the agricultural establishment of Viloffe, near Chatillon, who first discovered it. He has since found, that not only the straw of corn and other grains may be made into flour, but that hay and the stalks of trefoil,

lucerne, and sainfoin, are also convertible. Flour from these last, he gives to his sheep and lambs.* The public papers of March, 1830, stated that Mr. Gouldson had discovered a mode of separating and preparing the farinaceous parts of such bulbous roots as carrots, turnips, parsnips, beets, &c., and of converting it into a fine flour. After two years' experiment, he has now obtained a patent. He declares, that he really produces good and nutritious bread, equal, both in quality and color, to the finest white wheaten bread. The quantity of farina to be obtained from the roots grown upon any given quantity of ground, compared with that produced from the ears of wheat on the same space, is increased, he says, at least twenty times.

511. I may here briefly notice another reason for supposing that man will, in future ages, have recourse to a vegetable diet; though it refers to a period so distant, that it will be deemed worthy of little attention. It is a well-ascertained fact, that while plants decompose the carbonic acid contained in the air, and liberate the oxygen, all animals (except the microscopic animalcules) consume the oxygen, and restore the carbonic acid to the atmosphere. Combustion also diminishes the oxygen, and increases the amount of carbonic acid. Now, in proportion as animals multiply and vegetation decreases, the constitution of the atmosphere must be altered, and rendered less fit for the respiration of man. But it has been shown (200, 256, 463) that, on vegetable food, man requires less oxygen than on animal diet; therefore, by increasing the growth of vegetables for his food, and contracting the number of other animals, he preserves the purity of the atmosphere for an increasing human population, and for the continued existence of his species.

512. Some, perhaps, may be inclined to doubt the truth of calculations which show resources for a number so immensely beyond the present population of Great Britain. They are, however, based on undeniable facts, which were fully admitted by Mr. Arthur Young and Mr. Newenham, in their researches respecting the comparative amount of food yielded by wheat and potatoes; and, if not minutely correct, (which cannot be expected with such variable data,) they will at least be found a pretty near approximation to the truth. Some, again, will say—"Why look forward to a provision for such an amazing increase of mankind in these islands, which can only take place at an immeasurably distant period?" It has been proved, that in many countries where the means of subsistence are not limited, population has a tendency to increase in a geometrical ratio, doubling its numbers, in some instances, every twenty or five-and-twenty

* Bull. Univer., June, 1830, p. 157.

years ; and if there were no checks to the fulfilment of this law of increase, the present twenty-seven millions of inhabitants in the United Kingdom would, in the space of from one hundred to one hundred and twenty-five years, amount to eight hundred and sixty-four millions—nearly equal to the present population of the earth ; and a number which the most productive kind of food would not support in these islands, unless assisted by foreign produce. But it is evident, that this law of increase among mankind must, in all countries and in all ages, have met with many checks, such as scarcity of food, wars, pestilence, &c. ; otherwise the world would have long since received its maximum of human inhabitants.

513. Our population returns supply us with many valuable facts ; and from these we learn that the population of this country has, for the last forty years, been increasing after the rate of fifteen per cent. in ten years, or doubling its numbers in fifty years ; and if neither wars, disease, nor other checks interfere with this well-ascertained law for the next two hundred and fifty years, eight hundred and sixty-four millions will undoubtedly be the population of Great Britain and Ireland. Two centuries and a half, therefore, are a period not so distant as to be unworthy of the serious attention of every British subject. It is evident, also, that within a very brief space of time no considerable portion of the inhabitants of Great Britain can indulge in a diet of animal food, without immense foreign supplies ; and the law that operates here will, in the course of a few more centuries, densely populate other countries, and finally render a fruit and farinaceous diet equally necessary throughout the earth.

514. I shall, perhaps, be told that, “ages before a nation has arrived at the limit of its subsistence, its decay is prepared by a great variety of causes which, by destroying national virtue, pave the way for national decline. A survey of the fate of all the great empires of antiquity, and a consideration of the close resemblance which the vices and passions by which they were distinguished at the period of the commencement of their decline bear to those by which we are agitated, lead to the melancholy conclusion that we are fast approaching, if we have not already attained, the utmost limit of our greatness, and that a long decay is destined to precede the fall of the British empire. During that period our population will remain stationary or recede ; our courage will perhaps abate ; our wealth will certainly diminish ; our ascendancy will disappear ; and at length the Queen of the Waves will sink into an eternal, though not forgotten, slumber. It is more likely, than that these islands will ever contain human beings for whom sufficient sustenance cannot be obtained ; that its fields will return, in the revolutions of society, to their pristine desolation, and the

forest resume its wonted domain, and savage animals regain their long-lost habitations; and that a few fishermen will spread their nets on the ruins of Plymouth, and the beaver construct his little dwelling under the arches of Waterloo Bridge; the towers of York rise, in dark magnificence, amidst an aged forest; and the red-deer sport, in savage independence, round the Athenian pillars of the Scottish metropolis."*

515. This is indeed a dreary picture for the contemplation of the philanthropist; but is there no escape from the destiny which Mr. Alison has marked out for Britain? Are there no circumstances which distinguish *her* inhabitants from those of the states whose overthrow and desolation have been alluded to? Are there no means of averting the fate that has overtaken the empires of Persia, Greece, and Rome, whose former magnificence and splendor have been the admiration of later nations? I feel emboldened to declare my hope and belief that a far happier destiny awaits our island; but it would be too great a tax on the reader's patience to dwell upon it, and the means to be pursued for attaining it. I shall, therefore, merely throw out a few hints upon this important subject, for the serious consideration of those who may feel interested in it. The downfall of previous states may be attributed to two principal causes:

516. *First.* The accumulation of wealth in the hands of a privileged class; while the great body of the people were either slaves, or reduced to extreme poverty. The former became enervated by luxury; while the latter became vicious, degraded, and wretched, longing for opportunities to share the plunder of their oppressors.

517. *Second.* The mass of the people were suffered to remain in ignorance, totally devoid of all mental and moral culture. The selfishness, corruption, and effeminacy which the acquisition of wealth invariably produces, undermine the foundations of public prosperity, and prepare the downfall of a system which counteracts the ends of social union. Nurtured in ease and affluence, educated in pride and seclusiveness, the rich too often seek their own pleasure, regardless of the real welfare and just government of the community; while the lower classes, weighed down by poverty, ignorance, and vice, are both incapable and unwilling to make an effort to save the tottering state, which finally falls a prey to some more hardy nation. But in this country there has arisen a middle class of society, through whose intervention we may hope for the establishment of just laws and equal rights. The invention of printing, by which knowledge and information can be rendered permanent, plentiful, and cheap: the necessity that is now beginning to be acknowledged for a national education on

* Alison's Principles of Population, vol. II, p. 571.

correct principles ; and, above all, the recognized superiority of the Christian doctrines, of charity, forgiveness, forbearance, benevolence, equality, and unity of interests, are gradually preparing the way and laying the foundation for the establishment of the best principles of government, and the most perfect form of social compact. I neither anticipate nor desire that the rich should condescend to mingle with the vulgar and the dregs of human society ; nor that the wise and virtuous should find pleasure in associating with the ignorant and vicious ; but that the mass of the people should be so elevated by instruction and moral training, that their language, manners, and habits might no longer separate them from their fellow-men. In this state, the rich man will not consume the produce of an acre at a meal, while his unfortunate brother is left to starve ; but, the appetites and passions of all being brought under due restraint, there will be a gradual approximation to that kind of diet which, at the same time that it affords the most abundant supply, is also best calculated for promoting health, strength, enjoyment, and longevity ; as well as for subjugating the passions, maintaining evenness of temper and freedom of thought. Let it be remembered that population, when unchecked by wars, pestilence, and other causes, increases with amazing rapidity, and presses on the supply of nutriment ; that many sorts of fruit and farinaceous food can maintain from fifty to a hundred times the population which can be supported on a diet of flesh ; that vegetable food is conducive to the interests of man, whether physical, mental, or moral ; that under it he will be better able to comply with the checks that may hereafter be found necessary for limiting population ; and few, I think, will then doubt that a vegetable diet must hereafter become universal.

518. I have in some measure anticipated the remarks I purposed to make respecting the mental, moral, and social evidence in favor of a universal diet of vegetable food ; but I shall make a few more observations, under these respective heads, on the changes to be expected. From the present immense and increasing spread of information among all classes of society, the most beneficial results must ere long be the consequence ; and, if the efforts that are now being made for a national education of the lower orders be successful, it is impossible to calculate the blessings that may result from them, in the course of two or three generations. He who would correctly estimate the prospects of the future, should carefully note the numerous advantages society at present enjoys, in consequence of the progress of science and general knowledge within even the last fifty years. "Knowledge is power ;" and this power may be applied to good or evil, according to the constitution and moral training of its possessor ; but

when moral rectitude and Christian principles are combined with sound judgment and extensive knowledge in a considerable proportion of the people, then may we confidently expect the wisest regulations for securing the permanent peace, health, and happiness of the whole.

519. In proportion as intellectual vigor obtains ascendancy over the lower propensities, the constant inquiries will be: "What is truth?"—"What is the greatest good?"—not, "What is most fashionable or most customary, nor yet what is most conducive to present gratification?" When men have been taught to think, they will learn to act in accordance with the dictates of nature and truth; they will dare to practise what their reason approves, and have the courage to refuse what they know to be pernicious. The conventional and in many cases absurd usages of society will no longer be binding: mankind will be sufficiently enlightened to excuse singularities, where neither principle nor good feeling is compromised; and that man will be most highly estimated whose appetites and passions are so regulated that their highest gratification is in strict accordance with knowledge and prudence.

520. None but those who possess a salutary control over their appetites can be expected to pay much attention to arguments in favor of a natural diet; nor, if convinced, can they put in execution the resolves which a knowledge of the truth may have induced them to make. Few, then, at present are sufficiently convinced, or sufficiently resolute, to adopt a fruit and farinaceous diet; for the customs of society, and the temptations that are daily offered to an appetite corrupted by long habit, prevent the requisite exercise of a temporary self-denial, and resolution gives way before habits of a different kind have been firmly established. Thus are the dictates of truth and reason unheeded, and a slavish submission to the authority of custom and fashion becomes the rule of life, from which men have neither the will nor the power to emancipate themselves. But, as society progresses in knowledge, these difficulties will be diminished; and the change from bad habits to good will become more easy, in consequence of the majority being disposed to adopt those which promise the most permanent enjoyment and felicity. The physiological laws will be studied, and applied to the renovation of mankind, and to the production of the "*mens sana in corpore sano*."

521. The concurrence of the many in the same pursuit will encourage the timid and irresolute, and fewer temptations will then withstand the efforts of virtuous resolve. If, therefore, it can be proved that a fruit and farinaceous diet is the best for man, (of which, I think, we already possess abundant evidence,) this truth, like every other, will finally prevail; the

transition from a mixed to a pure vegetable diet will become easy and pleasant, and its adoption will at last be universal. I finally infer the universality of a fruit and farinaceous diet, from the important social and moral changes which both the Bible and wise men assure us will hereafter take place; when men will no longer absurdly oppose and thwart each other in their efforts to obtain the necessities and luxuries of life, which would be sufficiently abundant for all, if mutual interest and Christian charity were the ruling principles of action. Already have both individuals and nations discovered the advantages to be derived from acting unanimously; and the various classes of society are uniting their resources, and combining their influence, for mutual protection and the general benefit of the members; they are economizing force by unity of purpose, instead of neutralizing power by individual competition and opposing efforts.

522. How far this harmony of action and consolidation of interest, when accompanied by the general education and moral training of the people, may contribute towards the introduction of that happy state of mankind described as the Millennium, is not for me to determine. But if such a state should ever arrive, when each shall find his own happiness enhanced by promoting that of others; when men shall vie with each other in doing good, and brotherly love shall actuate every breast, even if the population of the world were no denser than it is at present in this country, it would be impossible for all to be supplied with a mixed diet of vegetable and animal food; and the very constitution of society being incompatible with a privileged class—feeding on an expensive kind of diet, while others submit to cheaper fare—it is reasonable to conclude that all will then resort to a fruit and farinaceous diet, which is also best adapted to all the wants of the human economy.

523. The sensitive and moral feelings of man will also, in such a state of society, have their unrestrained and proper exercise; their admonitions will be carefully noted and obeyed; the sufferings of dumb animals will no longer be disregarded; and their plaintive cries will no longer reach the ear, without at the same time moving the heart of man. "To take the life of any sensitive being," observes Dr. Dick, "and to feed on its flesh, appears incompatible with a state of innocence: and therefore no such grant was given to Adam in Paradise, nor to the antediluvians. It appears to have been a grant suited only to the degraded state of man after the deluge; and it is probable that, as he advances in the scale of moral perfection in the future ages of the world, the use of animal food will be gradually laid aside; and he will return again to the productions of the vegetable kingdom, as the original food of man—as that which is best suited

to the rank of rational and moral intelligence." It has been shown, that the direct tendency of animal food is to irritate the temper, to inflame the passions, to strengthen the lower propensities, to blunt the moral feelings, and to render the heart callous; and as immunity from disease, bodily strength and activity, symmetry and beauty of form, perfection and acuteness of the senses, unalloyed pleasure and enjoyment, mental exertion, and intellectual culture, as well as longevity, are favored by a diet of fruit, roots, and other farinaceous substances, we may conclude that these will constitute the diet of those who live during the second reign of peace and innocence on earth.

524. Then may it be said of man :

"No longer now
He slays the lamb that looks him in the face,
And horribly devours his mangled flesh;
Which, still avenging nature's broken law,
Kindled all putrid humors in his frame,—
All evil passions, and all vain belief,
Hatred, despair, and loathing in his mind,—
The germs of misery, death, disease, and crime.
No longer now the winged inhabitants,
That in the woods their sweet lives sing away,
Flee from the form of man; but gather round,
And prune their sunny feathers on the hands
Which little children stretch, in friendly sport,
Towards these dreadless partners of their play.
All things are void of terror: man has lost
His terrible prerogative, and stands
An equal amidst equals: happiness
And science dawn, though late, upon the earth.
Peace cheers the mind, health renovates the frame:
Disease and pleasure cease to mingle here;
Reason and passion cease to combat there;
While each, unfettered, o'er the earth extends
Its all-subduing energies, and wields
The sceptre of a vast dominion there;
While every shape and mode of matter lends
Its force to the omnipotence of mind,
Which from its dark mine drags the gem of truth,
To decorate its Paradise of Peace." *

* Shelley.

CHAPTER XVII.

CONCLUDING REMARKS.

525. I do not expect that those of my readers who enjoy what they consider good health, will be induced to test for themselves the truth of the views advocated in this work. They will perhaps say, "It is all very well for those to adopt a fruit and farinaceous diet who find a necessity for so doing; but, as we possess excellent health, and enjoy our food, we are satisfied that a mixed diet agrees with us best; and, therefore, shall make no change, but 'let well alone.'" They may think that constitutions are different, and that the food which agrees with some may not suit others. To such I would only observe, that the digestive and chylopoietic organs of all men are formed after one type; and that constitutions differ merely by slight congenital peculiarities, modified by long habit; and these differences would prove no serious obstacle to the gradual adoption of a more natural diet. If fruit and farinacea be the natural and best food of man, there cannot be a doubt that all would find this diet more conducive to perfect health, real pleasure, and long life, than any other. But let no one attempt the change who is not convinced that it is his interest or his duty to do so, or who is not determined to bear patiently the inconveniences that will be at first experienced. To commence requires great self-denial; and to reap all the pleasures and advantages that result, demands great perseverance. Unless, therefore, the mind be firmly resolved, the desire for more tasty and stimulating food will be continually recurring; and, so long as this is the case, no relish will be acquired for more simple fare. I should be sorry to induce any one to make such alterations in his mode of living as would diminish his pleasures, or interfere with the real enjoyment of life; and must leave each to adopt that course which he thinks will secure to him the most permanent felicity. "Let every man be fully persuaded in his own mind: prove all things, and hold fast that which is good." Many, however, who are suffering from disease, will be disposed to make trial of a diet which promises so many advantages; and it is to such that the following cautions and advice are more particularly addressed.

526. The generality of persons who have not lived on a full animal diet, may at once make the change without experiencing much inconvenience: but others will find it safer to adopt a fruit and farinaceous diet by degrees; and to permit a few weeks to elapse before they live on it exclusively. It has been already stated, that the gastric juice, and other secre-

tions, vary with the character of the ingesta ; (81 :) slight indisposition, therefore, may attend any sudden change of diet. It has also been shown, that when a stimulating diet has been exchanged for a simple and nutritious one, the circulation and respiration will probably become slower ; the physical force may appear diminished ; the frame may appear languid, and the spirits less buoyant. No one, however, need be alarmed at these effects : they are but temporary, and will soon be succeeded by more agreeable sensations. Prejudices against an exclusively vegetable diet are so strong, that those who commence it are apt to attribute to its use every disagreeable feeling, and every deviation from health which they experience ; regardless of many other circumstances which may have been the real cause. It must not be expected that the trial of a few weeks, or even of a few months, will be sufficient to eradicate any serious disease : some progress may be made in that time ; but Nature is slow in all her operations, and it is necessary that the whole of the blood and a considerable portion of the tissues should be renewed, before a complete state of health can be expected. In simpler and less dangerous disorders, a state of convalescence is very often produced remarkably soon. Medicine may, in many cases, succeed in effecting a cure much more rapidly ; but without a proper attention to diet, there is continual danger of a recurrence, or of laying the foundation of some other disease. Those who have been in the habit of taking much animal food, should commence the change with farinaceous articles, or preparations from them, (such as rice, sago, barley, wheaten flour, oat-meal, potatoes, &c.,) rather than with fruits, either ripe or preserved ; but these will be found very beneficial if gradually introduced. Care should be taken that the bread employed is not made from flour of too fine a quality ; as it very frequently produces constipation. Undressed meal is decidedly the most wholesome. (223.)

527. No operations are more necessary to be performed by the vegetable-eater than due mastication and insalivation : for unless these important processes be attended to, indigestion is almost sure to be the consequence. Chymification commences in the stomach on the surface of each individual fragment of food ; consequently, the smaller the particles into which it is comminuted by the teeth, the sooner it will be digested. (211.) The saliva has a considerable influence on farinaceous food ; and the glands which secrete it are large in all herbivorous and frugivorous animals. (31.) This fluid is alkaline ; and it is worthy of remark, that when any of the alkalis are taken for the purpose of neutralizing morbid acidity of the stomach, the nature of the saliva is entirely changed, and it assumes quite an opposite property. Many, therefore, produce serious mischief by neglecting to

employ an antidote supplied by nature, while they officiously substitute artificial preparations. Acidity, heartburn, &c., would frequently be easily removed, if the patient would voluntarily excite an increased flow of saliva, continue to swallow it for a few minutes, and occasionally repeat the act ; but this would seldom be necessary if proper food were used, and carefully masticated.

528. Each meal should be completely digested before another is taken ; and a period of repose should always succeed a period of activity. When the sensation of hunger is experienced in less time than six hours after each meal, it may be generally considered as a morbid craving, dependent on imperfect chylication ; in consequence of the too frequent ingestion of food, interrupting the ventricular and cæcal digestion. The faintness usually experienced by the dyspeptic, is only increased by frequent eating, and is most readily removed by fasting.

529. Moderate exercise in the open air, for the purpose of assisting the various secretions, is another essential requisite for the production and maintenance of good health. None can long neglect this rule with impunity ; but a sedentary life is certainly not so detrimental to those who live on vegetable food, as to those who live on an animal or mixed diet ; for reasons already stated. (195, 196, 202.) Unless sufficient oxygen be supplied to the lungs by daily exercise in the open air, the products of decomposition fail to be removed in sufficient quantity for the maintenance of a healthy state, and the assimilation of new matter is impeded. Without exercise, also, "the contractile power of the heart and large arteries is feebly exerted ; and, though sufficient to carry the blood to the ultimate tissue, it is nevertheless not strong enough to carry it through with the rapidity necessary for health. The ultimate tissue being thus filled faster than it is emptied, congestion takes place in those delicate and important vessels which compose it, as well as in the large veins, the office of which is to convey the blood from this tissue to the heart. One of the chief conditions of the body, in that general ill state of health usually denominated 'indigestion,' is congestion of blood in the ultimate tissue of our organs ; the brain, the lungs, the spinal marrow, the stomach, the ganglionic system, the liver, bowels, and all the organs concerned in the nutrition of the body." When the system, therefore, undebilitated by disease, will admit a good supply of oxygen by muscular exercise, it is the best means of diminishing the amount of venous blood, and, in conjunction with a legitimate supply of proper food, of increasing the amount of arterial blood ; and in proportion as the latter preponderates over the former, shall we possess health and muscular strength, as well as elasticity of mind.

530. "Oxygen," says Dr. E. Johnson, "is the only stimulating drink which we can take, with advantage to ourselves, for the purpose of invigorating our strength, and elevating our animal spirits. It is the wine and spirit of life—the true *eau de vie*; with an abundance of which nature has supplied us ready made; and it is the only one proper to man. If you be thirsty, drink water; if low-spirited, drink oxygen; that is to say, take active exercise, during which you inhale it." Violent exercise, except occasionally, and when the person is healthy and strong, should be avoided; for, though consistent with health, it renders the processes of decay and renewal too rapid, and hastens the period of old age.

531. The skin, being a very important excretory organ, should on no consideration be neglected. About thirty ounces of the worn-out materials of the body are said to escape, by insensible perspiration, in twenty-four hours; but the quantity varies with the temperature of the atmosphere, the amount of exercise, and other circumstances. The innumerable pores by which effete matters abounding in carbon and nitrogen are excreted, can perform their function with much greater freedom in the Herbivora than in man; because the artificial clothing which the latter is under the necessity of using, in cold climates, prevents free exhalation; and the skin becomes sheathed in an oleaginous compound, which materially checks the necessary process. The consequence is, that the lungs, kidney, and liver have additional duty to discharge; which frequently terminates in functional or organic disease. Hence arises the necessity for frequent ablution, in order to preserve the normal condition of the perspiratory pores. The warm bath, or sponging the whole surface of the body with tepid water, will effectually remove all extraneous matter from the skin; but, as warmth is debilitating, and cold, when judiciously administered, is a powerful tonic, it is desirable that cold water should be substituted, whenever the constitution will permit it. Many who have been extremely liable to coughs, sore throats, &c., have, by this means, been completely protected against a recurrence of these distressing and dangerous complaints. Nearly all who are not affected with organic disease may bear the cold bath, or cold sponging, in all seasons, with considerable advantage to health; but its daily use will prove injurious, if the body be exposed too long to the influence of cold, and unless a reaction and moisture of the surface be promoted, by subsequent muscular exercise, or by friction of the skin with the hand, the hair-glove, or the flesh-brush.

532. Several other rules for the preservation of health may be here mentioned; such as regular hours; early rising; good ventilation of the sitting and sleeping-rooms; avoidance of currents of air, and some others,

the importance of which is so generally acknowledged, that they require no recommendation. I shall, therefore, proceed to a brief enumeration of the most valuable articles of human diet, for the choice of those who are determined to dispense with the flesh of slaughtered animals.

533. The most valuable production, in this country, for the support of human life, is undoubtedly wheat. *Triticum vulgare* is supposed to be a native of the hilly parts of Asia, and has been rendered hardy by time and cultivation in more temperate climates. The flour of wheat may be used in a great variety of ways, forming bread, puddings, pies, &c., and is most wholesome when the bran has not been removed by dressing. Wheat, when boiled and afterwards used with milk, forms a nutritious and wholesome diet. From wheat also are prepared semolina, soujee, mannacroup, and various kinds of farinaceous food, as that by Mr. Hard, sometimes mixed with barley-meal, as in Densham's Farinaceous Food.

534. *Hordeum vulgare*, or barley, is another excellent grain, well known to the ancients. It is indigenous in Sicily and Russia, and may be cultivated in much colder countries than wheat. Pearl-barley is made from *hordeum distichon*, or "two-rowed barley;" it is excellent in soups, and forms very good puddings, when used either alone or mixed with rice.

535. *Avena sativa*, or the common oat, was found in a wild state by Anson, in the island of Juan Fernandez. This grain is frequently used as "grits" or "groats," but it is more commonly ground into a coarse powder called "oat-meal," which is made into cakes and puddings, or boiled with milk or water, or a mixture of both. It forms a very nutritious diet for children, as well as for persons of mature age.

536. *Oryza sativa*, or rice, is indigenous in India, where it has been cultivated from very remote ages. The Egyptians, Persians, Babylonians, and all the eastern nations, make great use of this grain. "It is the grand material of food, on which a hundred millions of the inhabitants of the earth subsist; and although chiefly confined by nature to the regions included between and bordering on the tropics, its cultivation is probably more extensive than that of wheat, which the Europeans are wont to consider as the universal staff of life."* Merat and De Lens state, that three-fourths of the inhabitants of the earth are nourished by this grain, which contains about the same amount of nutriment as wheat, but only a small portion of gluten. Some consider this grain inadequate to the full development of the muscular fibre. But if, as we have every reason to believe, the nitrogen of the atmosphere plays so important a part in the digestive processes, (185, 200,) the objection against rice, potatoes, and other articles

* Mareden's History of Sumatra, p. 65. 1811.

of diet which contain little nitrogen, falls to the ground; and as we have well-authenticated accounts of strong and muscular men being nourished solely by such diet, (269, 192, 276, 281, 497,) they afford additional evidence that there are other sources of nitrogen besides food. Rice is easily digested; and is an excellent article of food for the young and the old, the sick and the healthy. When formed into puddings, the addition of one-third of pearl-barley is considered a great improvement.

537. *Zea mais*, or maize, is another grain of great importance, and of high antiquity. Its culture is said to be more extended than that of wheat; and in Asia, Africa, America, and some parts of Europe, it is one of the principal aliments of the human race; but, as little of it is imported or produced in England, the remarks already made will be sufficient. Several other valuable grains, tubers, and fruits, are not noticed for the same reason.

538. Of tubers, the following are the most valuable: *Solanum tuberosum*, or potato. Cassava, from which tapioca is prepared. Salep, which is considered very nutritious, and is procured principally from *Orchis mascula*. Indian arrow-root, from *Maranta arundinacea*. Yams, extensively cultivated in Africa, Asia, and America. Arrachucha, cultivated in South America for its root, which is farinaceous and easy of digestion. *Bunium flexuosum*, or earth-nut, abundant in dry meadows in England, and no doubt a valuable root if properly cultivated. Sago, prepared from the pith of *Sagus farinifera*, and other palms. The following succulent roots are also valuable: Turnips, carrots, parsnips, beets, and Jerusalem artichokes. We have also various species of the Brassica, as the cabbage, cauliflower, broccoli, &c.; likewise peas, beans, kidney-beans, spinach, asparagus, seakale, onions, lettuce, celery, endive, artichokes, radishes, rhubarb, mushrooms, &c. Lettuces and other esculent vegetables should be used seldom and sparingly, and well masticated, because the stomach and alimentary canal of man are not well adapted for the digestion of them.

539. Fruits. The most abundant fruits in this island are apples, pears, and plums, which, when well masticated, may be freely indulged in by those who abstain from animal food. Apples may now be preserved the year round; and—when made into pies, puddings, &c.—are an excellent addition to the diet both of the rich and the poor. The other common fruits are cherries, mulberries, gooseberries, currants, brambleberries, bilberries, cranberries, raspberries, and strawberries. Others, requiring more care to bring them to perfection, are in less general use, as grapes, peaches, nectarines, apricots, pine-apples, and melons. The most valuable foreign fruits are figs, dates, dried grapes, (or raisins and currants,) prunes, French

plums, oranges, shaddocks, tamarinds, plantains, bananas, (or Indian figs,) mangos, mangostans, cocoa-nuts, and bread-fruit, many of which are imported, at moderate prices, either fresh or preserved."* Other vegetable productions are also worthy of notice, as almonds, walnuts, hickory or pecan-nuts, filberts, hazel-nuts, Brazil-nuts, cashew-nuts, butter-nuts, sweet acorns, chestnuts, sugar, treacle, and honey, the latter being a vegeto-animal production. If to this list we add vegetable oil, milk, cream, butter, curds, cheese, and eggs, we may, by selection and combination, have a diet as simple or as nutritious as any circumstances can require.

540. Surely the advocates for variety of diet will find the above bill of fare ample enough to satisfy any moderate desires. The difficulty does not consist, as some suppose, in finding a sufficient number of changes on a fruit and farinaceous diet, but in making a judicious selection. When a person has for some time been habituated to this diet, he finds many changes unnecessary, either for health, strength, or the most perfect gratification of the palate. That all vegetarians should adopt one uniform mode of living is perhaps neither possible nor desirable; for temperaments, constitutions, habits, and employments are so different, that a diet which is quite suitable for one may not be equally so for another; but their resources are so extensive that every peculiarity and idiosyncrasy may be suited. A few suggestions, respecting the kinds of food to be employed at each meal, may probably be acceptable to those who are wishful to make a trial of vegetable diet.

BREAKFAST.

Tea and coffee are in such general use by all classes of society in this country, that many will not be disposed to relinquish them. When not taken too hot, too strong, too copiously, nor too frequently, and accompanied with a sufficiency of wholesome bread, they may probably not do much injury; but those who suffer from nervousness, indigestion, palpitation of the heart, and similar disorders, ought, undoubtedly, to refrain from them entirely.³² Their utility under any circumstances is questionable, and they are productive of considerable mischief amongst the poor, many of whom take them three or four times a day in place of solid and more nourishing food. Cocoa and chocolate are preferred by some, and when good and properly prepared, are not likely to prove so injurious as tea and coffee; but, on account of the oil they contain, they do not agree with all stomachs.

* The Indies and other tropical climates abound in delicious fruits, as the durian, longan, litchi, rambutan, mammee-apple, custard-apples, rose-apples, cream-fruit, mangaba, laseeh, ochee, genipap, &c.; also various trees, yielding milk, butter, and oil.

[NOTE 32. The injurious effects of tea and coffee are generally very much underrated. Coffee is, in my opinion, not less noxious than wine, in its enervating effects on the whole nervous system. The green tea of commerce is nearly all drugged and adulterated, and a fruitful source of dyspepsia and nervousness in females. It is true that black tea is less injurious, because it is more pure and of less strength; but there can be no exception to the physiological law that, all unnatural stimulants, excitants, or nervines, are injurious precisely in proportion to quantity.—T.]

Gruel, made by boiling in water, oat-meal, barley-meal, or any of the preparations from wheat, (533,) may be substituted for tea, &c.; also boiled wheat, rice, tapioca, arrow-root, sago, &c. Milk, cold or boiled, or made into gruel with any of the above-mentioned articles, forms, with bread, a substantial breakfast for the young, and indeed for all with whom milk agrees, or who are not afraid of becoming too stout. With some it lies heavy on the stomach, and causes headache; but, if it is on other accounts desirable, it may be rendered more digestible by diluting it with water and adopting it by degrees; a little perseverance will reconcile the stomach to the use of it. Porridge, made with hominy, oatmeal, barley-meal, bread-meal, or rice, forms an excellent breakfast; it is usually eaten with treacle and new milk. Fruit, fresh or preserved, or dried, as raisins, figs, dates, &c., butter, honey, eggs, cheese-cakes, fruit-pies, &c., are useful appendages to the breakfast-table, if care be taken not to indulge in too great a variety at one time. Many prefer a breakfast consisting merely of bread, with butter or honey, fruit and water; others may choose, and probably require, one or other of the above simple preparations.

DINNER.

This meal may consist of the usual vegetables and fruits; also puddings, pies, eggs, omelets, fritters, cheese-cakes, macaroni, vermicelli, rice, sago, pearl-barley, tapioca, cheese, &c., cooked in an almost endless variety of ways; for descriptions of which I must refer the reader to "Recipes of Vegetarian Diet," and "Vegetarian Cookery." *

SUPPER.

Supper may be selected from the preparations recommended for breakfast.

Until the habit has been formed of living as here recommended, it is to

* [These works have not, so far as known, been republished in this country. See, however, Note 33, on following page.]

be expected that some inconvenience will be experienced ; and, probably, great self-denial will be required, as is always the case in dispensing with any time-honored habit which has yielded us much pleasure ; but when this mode of living has been thoroughly established, it will be found much more congenial to health, and productive of much more real enjoyment than the usual dietetic habits of this country. It will do more ; it will conduce to that peace of mind which flows from a consciousness of having listened to the voice of conscience, speaking through our instinctive sympathies, which urges us to respect the feelings of organized beings like ourselves : speaking through our rational faculties, which discover to us the manifest design in the structure and arrangement of our organization, and loudly calling upon us to abide by our adaptation, and to obey the truth : speaking to us through the higher faculties of faith, hope, and charity or benevolence, which direct us to promote social harmony, universal peace, and general happiness, not only amongst human beings, but throughout all animated and sensitive nature.

I conclude by earnestly recommending all who have a regard to their own health and happiness, all who are friendly to human progress, all who are desirous of promoting the final triumph of knowledge and wisdom over ignorance and folly, and of the nobler faculties over the passions and propensities, to give the diet a fair trial ; and, since the advantages anticipated are so great, not to be deterred from persevering, except by the most convincing proofs that to do so would be injurious to them.³³

[NOTE 33. To those who desire formularies for cooking *physiologically* on the vegetarian system, I would recommend the *Hydropathic Cook-Book*, published by Fowlers and Wells.

T.]

A P P E N D I X .

A.—See § 130.

A VERY remarkable fact relative to the oxen of South America is recorded by M. Roulin ; and is particularly adverted to by M. Geoffroy St. Hilaire, in the report made by him on M. Roulin's Memoir, before the Royal Academy of Sciences. In Europe, the milking of cows is continued through the whole period, from the time when they begin to bear calves till they cease to breed. This secretion of milk has become a constant function in the animal economy of the tribe : it has been rendered such by the practice, continued through a long series of generations, of continuing to draw milk long after the period when it would be wanted by the calf. The teats of the cow are larger than in proportion ; and the secretion is perpetual. In Columbia, the practice of milking cows was laid aside ; owing to the great extent of farms, and other circumstances. "In a few generations," says M. Roulin, "the natural structure of parts, and withal the natural state of the function, have been restored. The secretion of milk in the cows of this country is only an occasional phenomenon, and contemporary with the actual presence of the calf. If the calf dies, the milk ceases to flow ; and it is only by keeping it with its dam by day, that an opportunity of obtaining milk from cows by night can be found." This testimony is important, on account of the proof it affords, that the permanent production of milk, in the European breeds of cows, is a modified function of the animal economy, produced by an artificial habit, continued through several generations.

Two other very important observations made by M. Roulin in South America, were pointed out by M. Geoffroy St. Hilaire, in his report to the Academy of Sciences. They refer to the fact of hereditary transmission of habits originally impressed, with care and art, upon the ancestors. Of this fact I shall adduce other examples in the sequel ; at present I only advert to M. Roulin's observations. The horses bred on the grazing-farms

on the table-land of the Cordillera, are carefully taught a peculiar pace, which is a sort of running amble. This is not their natural mode of progression; but they are inured to it very early, and the greatest pains are taken to prevent them from moving in any other gait. In this way the acquired habit becomes a second nature. It happens occasionally that such horses, becoming lame, are no longer fit for use: it is then customary to let them loose, if they happen to be well-grown stallions, into the pasturo-grounds. It is constantly observed, that these horses become the sires of a race to which the ambling pace is natural, and requires no teaching. The fact is so well known, that such colts have received a particular name: they are termed "aguillillas." The second fact is the development of a new instinct, which (as M. Roulin declares) seems to become hereditary in the breed of dogs found among the borderers on the river Madeleine, which were employed in hunting the pecari. I shall cite the author's own words: "L'adresse du chien consiste à modérer son ardeur; à ne s'attacher à aucun animal en particulier, mais à tenir toute la troupe en échec. Or, parmi ces chiens, on en voit maintenant qui, la première fois qu'on les amène au bois, savent déjà comment attaquer; un chien d'une autre espèce se lance tout d'abord, est environné, et (quelle que soit sa force) il est dévoré dans un instant."

It appears that barking is an acquired hereditary instinct. It has become natural to domesticated dogs and young whelps to learn to bark, even when separated at birth from their parents. It has been conjectured, that barking originated in an attempt to imitate the human voice. However that may be, wild dogs do not bark. There are numerous troops of wild dogs in South America, principally in the Pampas. There are also in the Antilles, and in the isles on the coast of Chili, similar breeds. These breeds, in recovering their liberty, have lost the habit of barking. Like other uncultivated breeds of dogs, they only howl. It is known that the two dogs brought to England by Mackenzie, from the western parts of America, could never bark, and continued to utter their habitual howl; but a whelp bred from them in Europe learned to bark. It has often been observed, that the dogs in the island of Juan Fernandez—the progeny of those which were left there purposely by the Spaniards, before Lord Anson's time, with the design of exterminating the goats—were never known to bark. A curious observation of M. Roulin is, that the cats in South America have, in like manner, lost those "*miaulemens incommodes*" which are so often heard during the hours of night, in many parts of Europe.*

* Dr. Pritchard's Natural History of Man, p. 84.

C.—SEE § 492.

Proximate Principles and Value of various kinds of Grain, Roots, &c.

GRAIN, &c.	Solid Matter per cent.	Flesh-forming Principle.	Heat-forming Principle.	Price per Stone of 14 lbs.		Nutriment per Stone.		Flesh-forming Principle per St'n	
				s.	d.	s.	d.	s.	d.
Wheat, . . .	85	21	62	1	6	1	9	7	2
Oats, . . .	82	11	68	1	0	1	2	9	0
Peas, . . .	84	29	51	1	6	1	9	5	2
Beans, . . .	86	31	51	1	6	1	9	5	0
Barley-meal, . .	84	14	68	1	2	1	5	8	4
Maize-meal, . .	90	11	77	1	0	1	1	9	0
Rice, . . .	82	8	82	3	6	3	9	41	1
Sago, . . .	88	3.4	84	4	0	4	6	117	8
Potatoes, . . .	23	2	25	0	6	1	9	25	0
Beef, . . .	25	25	0	7	0	28	0	28	0
Carrots, . . .	13	4	10	0	3	1	11	12	6
Turnips, . . .	11	1	9	0	1½	1	2	12	6
Beet-roots, . .	11	1.5	8.5	0	2	1	6	11	1

The first column in the table shows the amount of nutriment per cent. in the various articles, the remainder of the hundred being water. Wheat, for instance, contains 85 per cent. of solid nutriment, consequently 15 per cent. of water. In the second and third columns is seen how this nutriment is divided into flesh-forming and heat-forming principles according to the views entertained by Liebig and others. (§§ 177 and 200.) The ashes supposed to form the bones, vary from 1 to 3½ per cent., and are omitted in the table. In the fourth column is given the price of each article in its marketable state per stone; these prices may be considered the average of a number of years. In the fifth column is seen the price of real nutriment free from water; and in the sixth the price of the flesh-forming principle per stone, rejecting altogether the amount of the heat-forming principle. If the prices in the last column be considered the real value of each article, then sago and rice are the dearest, beef the next, and beans the cheapest; but, until we are better acquainted with the real principles of nutrition, and with the changes effected upon food by the assimilating processes of the animal economy, it will be nearer the truth to estimate all articles used for human food by the amount of solid nutriment, including both the heat-forming and flesh-forming principles. The above table has been formed principally from the analyses of Playfair and Boussingault; but chemists differ so widely in the results of their experiments, (chiefly owing to real differences in the specimens examined,) that the numbers should only be considered as an approximation to the truth. What is represented as containing from 11 to 35 per cent. of gluten; oat-meal, from 3 to 16 per

cent.; yet some consider oat-meal more nutritive than wheat-meal, and ascribe this superiority to the ready-formed oil or fat which it contains.

D.—See § 507.

A Table exhibiting the produce of an acre of land in Wheat, Oats, Potatoes, and Beef; their relative value as food, cost of production, and average price.

	Annual produce of one acre in stones of 14 lbs. each.	Pounds consumed daily by one person.	Acres requisite for the support of one person.	Relative intrinsic value.	Cost of production per stone in pence.	Cost per acre in pounds sterling.	Average price per stone.
	1.	2.	3.	4.	5.	6.	7.
Wheat	120	1½	$\frac{1}{3}$	4	d. -12	£ 6	d. 18
Oats	183	2	$\frac{2}{3}$	3	8	6	12
Potatoes	1440	6	$\frac{1}{6}$	1	2	12	6
Beef	13	6	12	1	55	3	84

The columns 1, 2, and 3 will be easily understood by the heading of each; thus the annual produce of an acre of land under wheat is 120 stones, of beef only 13 stones. On an *exclusively* wheat diet, a man would require 1½ lb. per day, and one-third of an acre to supply it; whilst on an *exclusively* beef diet he would require 6 lbs. per day, and twelve acres of land to supply it. (See § 500, &c.) Column 4 shows that, as regards intrinsic value for human food, beef should be the same price as potatoes, and wheat four times the price of either. Column 5 gives the cost of production per stone, including rent, tithes, taxes, labor, and seed; and column 6 the cost per acre. By comparing columns 5 and 7, we perceive that the average price of each article is half as much more as the cost of production, except in the case of potatoes, the price of which is three times the cost of production, and one-third the price of wheat; whereas their intrinsic value is only one-fourth, according to column 4. By comparing the current prices of any period with column 4, we ascertain whether they bear a proportionate relation to each other; and, by comparing them with the prime cost in column 5, we may find the profits of the producer in return for his capital, skill, &c. I have considered the expense of growing a bushel of wheat to be four shillings and threepence, whereas Earl Ducie

says it may be grown for three shillings and sixpence ; but wheat cannot be grown at these prices, except under the most improved modes of culture. The data upon which the table has been formed were received from practical men, and I have no reason to dispute their correctness ; yet, unless average crops be obtained at the expense mentioned, the profits will of course be reduced in proportion to the decrease in produce and increase in cost.

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